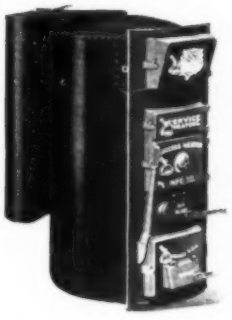
American Artisan

Founded 1880

The Warm Air Heating and Sheet Metal Journal

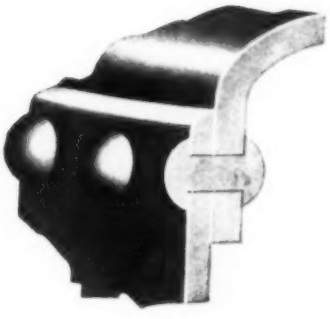
Vol. 95, No. 19 CHICAGO, MAY 12, 1928 $2.00 Per Year

Three More Points to Consider



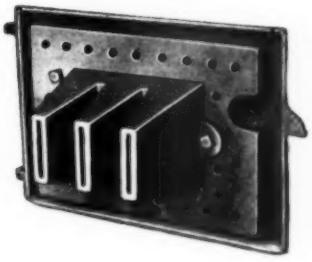
THE cut below shows the three tube tuyere or smoke consumer which is attached to the feed door of all SUCCESS Heaters.

The tubes project into the fire pot approximately five and one-half inches and become heated to a high temperature, heating the air as it passes through. This air, heated to a high temperature, readily mixes with the gases, causing complete combustion. Thus the black smoke and soot are turned into heat, greatly increasing the efficiency of the heater.



SUCCESS Heaters have the only absolutely gas-tight collar. It is not merely a lap joint, as in some so-called dove-tailed joints, but is a ground joint, enclosed on all four sides, making an absolutely gas-tight joint at all times and under all conditions, without the use of bolts or gaskets.

The installer, when setting the heater, simply hangs the radiator on the body collar, the weight of the radiator tightening the joint.

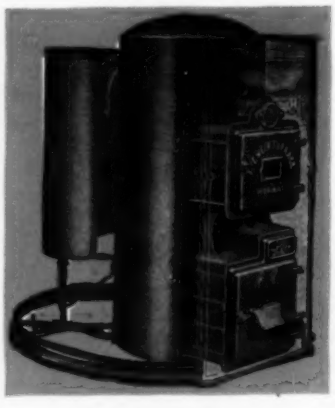


THIS cut shows a section of the joint of a SUCCESS Heater. Note the method of riveting the ARMCO Ingot Iron plates. These plates are accurately punched by machines. Then the large, heavy rivets are driven cold by special machinery, working under high pressures. After riveting, they are caulked by machines, making a joint which will remain absolutely gas, smoke and soot-proof as long as the heater remains in use.

The method of joining the plates of a SUCCESS Heater is what makes the difference between the old style furnace and the modern up-to-date heater.

Manufactured by SUCCESS HEATER MANUFACTURING CO., Des Moines, Iowa

the materials and features which are *ordinary or standard* for other steel furnaces *are not good enough for*



the ***Original***

Weir Steel Furnace

that's why it's a better furnace

IN a series of Weir advertisements to follow in this publication the Weir will be described and illustrated feature by feature in order to show you in detail why and wherein the Weir excels.

The MEYER FURNACE CO.
Peoria-Illinois

James Gamble Rogers, Inc., Architects; Marc Eidlitz & Son, Inc., Builders; L. A. Storch & Co., Sheet Metal Contractors.

The Sheet Metal Work on the World's Greatest Medical Center *is* ANACONDA COPPER

TOWERING above Washington Heights, New York, the majestic buildings of the new $18,000,000 Medical Center will take their place as one of the architectural achievements of the twentieth century.

To give permanent protection against the elements at the minimum upkeep expense, Anaconda Copper has been selected for skylights, flashings, gutters and leaders. Purity is the measure of long life in copper. Anaconda Sheet Copper is guaranteed 99.9% pure—yet costs no more than good copper should.

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Offices and Agencies in Principal Cities
Canadian Mill: ANACONDA AMERICAN BRASS LTD., New Toronto, Ont.

ANACONDA COPPER
BRASS ANACONDA from mine to consumer BRONZE

Published Weekly by American Artisan and Hardware Record, Inc., 620 South Michigan Avenue, Chicago, Illinois. AMERICAN ARTISAN—the Warm Air Heating and Sheet Metal Journal—entered as second class matter, March 26, 1928, at the Post Office at Chicago, Illinois, under act of March 3, 1879. Formerly entered on June 25, 1887 as American Artisan and Hardware Record.

MONARCH and NIAGARA FURNACES ARE MADE IN CLEVELAND

The excellent Uniformity of our furnaces is generally recognized.

Our methods of maintaining and assembling each furnace before leaving the plant ensure proper fit when assembled by you on the job.

WHILE at the Convention plan to see how well NIAGARA and MONARCH FURNACES are designed and manufactured.

You will be cordially welcomed at our new headquarters—

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SPECIAL AUTOS TO MEET YOU AT THE STATLER HOTEL DURING THE CONVENTION.

THE FOREST CITY-WALWORTH RUN FOUNDRIES CO.

1220 MAIN AVENUE FURNACE DIVISION CLEVELAND, OHIO

EVERYTHING CAN BE MADE CHEAPER AND SOLD FOR LESS!

but that is not the policy the FLORAL CITY HEATER CO. has built on for the past forty-five years.

Dependable merchandise built by satisfied workmen who take pride in their work and do not figure "how much" but "how good"—marketed at a price which allows a fair profit to all concerned—latest features incorporated when proven of value, are a few of the outstanding reasons for the increasing growth and favor of the FLORAL CITY QUEEN furnaces by the class of dealers who want the best money can buy and who believe in giving their customers the best on the market.

If interested we would be glad to submit our agency proposition—we know it will make you sit up and think.

SOME CHEAPER—NONE BETTER

Officially measured and rated

REMEMBER—WE SELL ONLY TO THE TRADE

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Floral City Heater Co.

Chicago Office
1654 Monadnock Building

MONROE, MICHIGAN

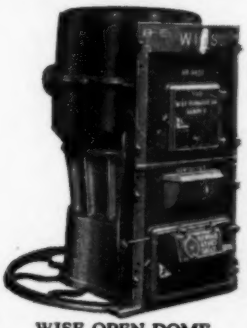
Detroit Office
4453 Cass Avenue

Mention AMERICAN ARTISAN in your reply—Thank you!

WISE

The Better Furnaces

New WISE Improvements



WISE OPEN DOME CAST FURNACE

THE New Wise Open Dome is improved with the *Wise Cellular Firepot.*

It is *One-Piece* and heavily con s tructed.

It has a series of air cells which extend from bottom to top which enable the air to become pre-heated before entering above and into the fuel. This supplies a continuous and evenly distributed air blast.

Another feature is the Elbow Shaped Flue Collar on Inside of Radiator which is turned up so all of the heat Must follow the castings to the top before entering flue.

WISE 20 SERIES CAST FURNACE

New WISE Ideas

THE Famous Wise 20 Series has added still more fame for itself since this new *Patented* radiator appeared.

The feed chamber and the top radiator are so constructed as to allow communication between them which brings the opening of the fire flues of the radiator directly into the feed chamber, making the flues readily accessible for cleaning through the upper feed door. The dirt falls directly into the fire-pot, eliminating the necessity of taking the soot out by means of a narrow neck passage. This is a big advantage to the owner as a radiator that is easy to keep clean will be kept clean. And this means increased heating efficiency

This improved Wise Furnace has a New Cellular Fire Po that provides complete combustion.

a New Steel Furnace

WISE STEEL FURNACE

TO enable you to confine your *quality furnace* business to one house the Wise Steel Furnace was created. Notice that the Wise Steel Furnace is a *better* steel furnace having features that make it *last* longer where others have weak spots.

The bottom of the radiator on the Wise Steel Furnace has a *Cast Iron Soot Box and Clean Out.*

This you know is the big weak spot in other steel furnaces

The Wise Steel Furnace like all Wise furnaces is *Guaranteed* high quality. It possesses all the latest scientific heating features and all modern conveniences. It is *riveted* and *welded* and has *special design grates.*

Write for the new Wise catalog, No. 23, just out and special circulars illustrating these New Wise Furnaces and features in detail. Be a Wise dealer now and for all time.

The Wise Furnace Company

AKRON, OHIO

Quality Made *for a* Quality Business

If you ever expect to get ahead in the furnace business, you have got to do business out of the ordinary.

The place to begin is with the furnace you sell. Take on the new Series "C" Moncrief Furnace. It has selling points that sell quicker, construction points that make installation easier, and efficiency features that make heating better.

If you want to do more business and make more money, ask us for the particulars of our proposition.

The HENRY FURNACE & FOUNDRY CO.

3471 E. 49th St. Cleveland, Ohio

Eastern Office, Room 1306, 11 W. 42nd Street, New York City . . . E. L. Garner, Manager

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MONCRIEF FURNACES

Announcing—

A *New* and *Better* furnace

In the NEW NESBIT "Moist Heat" (Registered) Furnace

You will find many outstanding selling points, not to be found on any others, and in addition all of the modern features of construction so necessary to the up-building of a successful and lasting heating business.

Write for Catalogue and Our Agency Plan

A few of the Outstanding Features

"Oversize" construction.
Extra large humidifier.
Pouches extend *thru* and *beyond* the front.
Solid one-piece base.
Brass bolts and hinge pins.
Large doors.
Heavily ribbed firepot and combustion chamber.
Upright E-Z Shaker if desired.

STANDARD FURNACE & SUPPLY CO.

Complete Furnace Service At Your Command

OMAHA, NEBRASKA

BRILLION *FURNACES*

YOUR CUSTOMERS EXPECT HIGH QUALITY

THE furnace dealer who sells on *price alone* is not building a sound business.

A fifty or hundred furnace real estate order is fine if you are able to give good quality.

The Brillion will solve your problem in the competitive price field. It is low priced but the *quality is good.*

Our overhead is *low*—our sales plan is *different*—we have no high priced executive staff—therefore *can give better quality* at a better price.

Just investigate

BRILLION FURNACE CO., 17 No. La Salle St., Chicago
200-300 Park Ave., Brillion, Wis.
Send me full details and catalog No. 60

Name.....

Address.....

ANOTHER **RYBOLT FURNACE**

Write for Catalog and Dealer Terms

Manufactured by

THE RYBOLT HEATER CO.
ASHLAND, OHIO

A FIRST class piece of goods selling at a moderate price has the call on all competition at all times.

There are many *cheaper* furnaces than the Rybolt, and a lot of *higher priced* ones, but the Rybolt represents the greatest furnace value of all, dollar for dollar.

Say you saw it in AMERICAN ARTISAN—Thank you!

PROVEN

in Principle

in Performance

and Now in SALES

The New Richardson
"PERFECT"
Square Cased Warm Air Heater

A new era in home beauty. And a new era in heater sales! Home owners who formerly thought their run-down heaters were "good enough" have been captivated *and sold* by the handsome appearance of the Richardson Square Cased Warm Air Heater.

But the installer knows that its beauty is more than skin deep. For under the square outer casing is the same heater that has made Richardson and Boynton famous. No experiment here, but a proven heating success that is reflected in sales.

Let us explain the extra insulation and other additional features of this new heater. Write for full details today.

RICHARDSON & BOYNTON Co

Manufacturers of "Richardson" "Perfect" Heating and Cooking Apparatus Since 18

260 Fifth Ave. — New York City

New York Utica Newark Philadelphia Bost Chicago Buffalo Minneapolis Cincinnati Pittsburgh Detroit rovidence

Nested Cold Air Pipe

COLD AIR *is just as important as* WARM AIR

—A little easier to handle to be sure but it needs good quality pipe and easily adjustable elbows.

The handiest COLD AIR pipe and elbows come from the home of HANDY PIPE.

Write for catalog No. 45 which tells you more about it.

F. MEYER & BRO. CO.
PEORIA, ILL.

Galvanized Adjustable Elbows

The AUERISTOCRAT

of all registers, combining air capacity, decorative and concealing features.

Designed to conform with the Standard Code so they fit all standard boxes.

Auer Patented mechanical features make it perfect in operation,—quick and easy to install.

Auer's Save Hours and Dollars

The AUER REGISTER CO.
Cleveland, Ohio

BOLTS

WE MANUFACTURE A COMPLETE LINE OF BOLT PRODUCTS, INCLUDING STOVE BOLTS, CARRIAGE BOLTS, MACHINE BOLTS, LAG BOLTS, NUTS, COTTER PINS, ETC. ALSO STOVE RODS, SMALL RIVETS AND HINGE PINS. CATALOG ON REQUEST.

THE LAMSON & SESSIONS CO.
THE KIRK-LATTY CO.
1971 W. 85th St. Cleveland, O.

Read This Practical Book NOW

SNOW'S FURNACE HEATING
(Enlarged Revised Edition)

A book that deals with the different types of furnaces, their construction, proper location and setting together with furnace fittings. It is the standard authority.

This new edition contains a chapter covering the main features of one pipe or pipeless furnace heating, which has become a big factor in warm air heating.

Contents—Furnaces; House Heating, Combination Systems; Air, Heating and Ventilation of School Buildings; Heating of Public Buildings, Churches and Stores; Fan Furnace Combination System; Temperature Control; Estimates and Contracts, Fuels; Miscellaneous Tables and Data; Furnace Fittings; Miscellaneous Notes, from Various Sources on Furnace Heating.

264 Pages
PRICE, $3.00
Postpaid

Order your copy now and ask for our 10 page catalog of books.

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Read the Wants and Sales Pages

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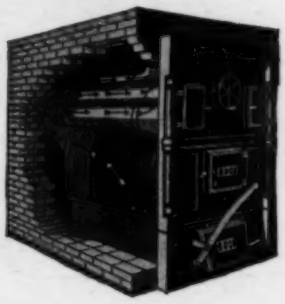


Install the Giant Roto-Blast Furnace

Let us show you how to make big profits by installing Roto-Blast Furnaces. Our engineers will gladly draw up your heating and ventilating specifications. Write for prices and descriptive booklet.

You can easily land them with a Roto-Blast Tubular Furnace. It is used in connection with a Fan System and can be installed in large buildings such as Churches, Gymnasiums, Factories and Garages, where steam installations are now being made.

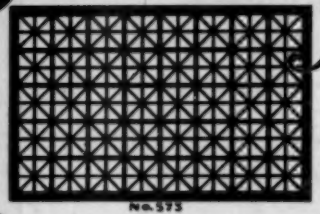
With its sturdy construction, seven square feet of grate area and large heating surface, the Roto-Blast enables you to secure big jobs easily and also gives you the large profits the steam fellows are now getting.

MANUFACTURED BY

THE MONCRIEF FURNACE CO.
ATLANTA, GEORGIA

Wrought Steel H&C And Bronze

GRILLES



For all grille requirements write
The Hart & Cooley Mfg. Co.
New Britain, Conn.

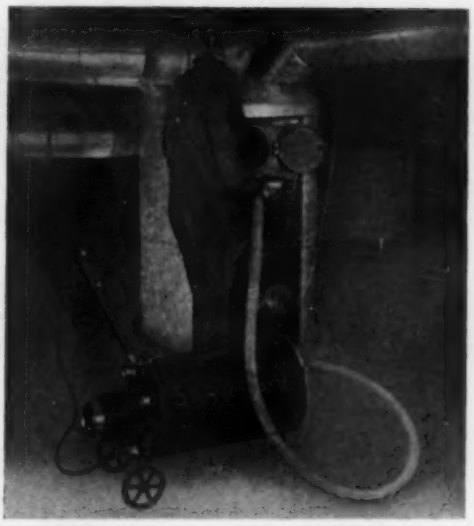
No. 575 No. 578 No. 573 No. 590

PATTERNS FOR STOVES AND HEATERS
THE CLEVELAND CASTINGS PATTERN COMPANY
CLEVELAND, OHIO

PATTERNS

FOR STOVES AND HEATERS FIRST-CLASS IN WOOD and IRON
VEDDER PATTERN WORKS ESTABLISHED 1835 **TROY, N. Y.**

IRON AND WOOD
STOVE PATTERNS
QUINCY PATTERN COMPANY
QUINCY, ILLINOIS



FURNACE MEN Handle More Business This *QUICK* Way

NOW that Spring is here furnace cleaning business will soon be on the boom. Add a Sturtevant Furnace Vacuum Cleaner to your cleaning equipment and handle more business. Customers will be easy to get and competition will be easy to meet in your community if you introduce this clean quick way of cleaning furnaces.

A larger repair business results too! The vacuum method of cleaning furnaces is far superior to the old sack and brush method which scatters dust throughout the house and leaves a dirty cellar. Owners appreciate this fact, and readily consent to having their heating plants cleaned by vacuum. Consequently you have a better chance to get into cellars, clean the furnaces, and recommend repairs—or possibly sell new heating plants if any are needed.

Don't overlook this opportunity to increase your profits. The Sturtevant Furnace Vacuum Cleaner is the quickest and most thorough furnace cleaning device on the market. Also the lightest in weight and the easiest to handle. Send in the coupon NOW for further information.

Agents wanted for territories in Indiana and west of the Mississippi. Submit qualifications

Sturtevant
PUTS AIR TO WORK

HYDE PARK, BOSTON, MASS.

Dept. AA-5-12

B. F. Sturtevant Company,
Hyde Park, Boston, Mass.

Without obligation to me, send along further information and price on the Sturtevant Portable Furnace Cleaner.

Name .....

Address .....

City ..... State .....

Founded 1880

Published to Promote Better Warm Air Heating and Sheet Metal Work

American Artisan

The Warm Air Heating and Sheet Metal Journal

Yearly Subscription Price:
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THE MOST VALUABLE THING IN THE WORLD

I am the most desirable thing in life. Without me no one can be healthy, happy or useful.

The hidden wealth and vast resources of this earth would have no value without me.

I am the great developer of man. No other agency has called forth so many of his hidden treasures, developed more power of mind and body than I have.

Men and women who try to get along without me are characterless, selfish, undeveloped, useless and unprofitable members of society. I am behind every fortune, every art and science, every achievement, every triumph of man.

Rich men and poor men alike often try to find substitutes for me, hoping thereby to secure a larger measure of happiness, peace, and satisfaction, but they are always bitterly disappointed. Instead of gain, every substitute for me brings them infinite loss.

As the creator is greater than the creature, so I am greater than wealth, power, fame, learning, or any other acquired possession or quality of man, because I am the source through which he acquired them.

I am—Work.

XXth CENTURY FURNACES

1952 A. D.
1928 A. D.

24 Years

(Average record of service)

ACCORDING to their 24½ year average record of service, XXth Century Furnaces bought today should last until 1952.

You can't beat that for value and service.

Selling XXth Century Furnaces is the stuff that builds reputations and profits.

Surely and steadily XXth Century Dealers are forging ahead. With so many advantages to work with you, too, can make faster progress with this superior line.

The coupon below is for your convenience.

The XXth Century H. & V. Company

Akron, Ohio

"Manufacturers of fine furnaces for 34 years"

The XXth Century H. & V. Co.
Akron, Ohio

Please provide us with the complete XXth Century Dealer Proposition.

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"We naturally get better results when working it up"

"You will be glad to know that we have used ARMCO Ingot Iron in our work for a number of years. It's gratifying to be able to recommend ARMCO Ingot Iron sheets to our clients as a superior rust-resistant material, since by doing so we can more thoroughly satisfy their wants.

"We would rather use this pure iron than steel in our shop because it is a soft-working material and we naturally get better results when working it up, and this saves us money. As you know, we have recently purchased a full carload of ARMCO Ingot Iron which we carry in stock and use exclusively."

BUILDERS SHEET METAL AND ROOFING COMPANY, Inc.
Seattle, Washington
Mark Favro, Sec.-Treas.

Your shop, too, can share in the many advantages that go with an "Ingot Iron Shop" franchise. Your blue and white identification sign attracts prospects. Millions of sheet metal buyers are reading about "quality work with quality iron" in their favorite magazines.

Moreover, your shop overhead is lowered, thus assuring you increased profits . . . . . ARMCO Ingot Iron, because of its workability, does cut labor costs—in the shop and on the job.

The next time your sheet metal salesman comes around ask him for an application card. Or else write us direct.

ARMCO
INGOT IRON
RESISTS RUST

ARMCO Distributors' Assn. of America

Executive Offices: Middletown, Ohio

American Artisan
The Warm Air Heating and Sheet Metal Journal

Vol. 95 CHICAGO, MAY 12, 1928 No. 19

Electricity Displacing Steam Power Plants Gives Impetus to Warm Air Heating

Warm Air Heating Unit Found to Fit Into Program of Economy

THE VERY marked tendency of manufacturing plants to turn to electricity for their power requirements is placing an entirely new aspect upon the importance of the warm air heating unit for the large factory building, garage, and warehouse. If it is more economical to use electrical power with which to run the machinery, the building must still be heated and the economies obtained by using electrical power would be largely offset where a steam plant had to be maintained for heating purposes. Here is where the warm air heating unit comes into its own.

Plant of the Youngstown Welding Company, Youngstown, Ohio, in Which a Warm Air Heating System Has Displaced the Old Steam System of Heating

Today the heating problem is heard from every side; better, cleaner, and cheaper heat. To that cry, Mr. Leif Lee, consulting engineer for steel companies, was brought into the picture during the war to design and install a heating system to deliver clean, healthful heat, keeping only the warm air theory in mind. It was a hard steady uphill pull, until today Mr. Lee has a warm air heating system that will do more than steam will do.

The building is never too large, or the exposure so that the warm air system cannot heat it.

Starting in the hardest field of heating, the steel mill construction where sides and roofs of buildings are mostly sheet metal, Mr. Lee has developed a system of heating that is outstanding for these buildings.

Today this system is used not only for heating garages, industrial buildings, school houses, but is also used to dry paint on automobiles, and in thawing out of coal cars in the Great Lakes District.

The development of large central power stations has made it possible for manufacturers to purchase their needed power cheaper than they can produce it, individually. This development stresses the need for an efficient heating system, for if a steam plant with its many costly accessories must be maintained for heating alone the purpose of economical power production is to a large extent defeated.

Heating by warm air has long been recognized as the most desirable method, but when the air used must be heated by steam coils the effectiveness of this system is lost. Small steam heating plants, at their best not highly efficient, must carry the additional charges of high initial cost, large fuel consumption, licensed labor charges, boiler insurance, high re-

Illustrating the Warm Air Heating Unit Now in Service at the Plant of the Youngstown Welding Company. Mushroom Ventilators in the Floor Provides the Ports Through Which the Heat Passes.

pairs and expensive maintenance. To overcome these difficulties the Lee air heater, a direct-fired furnace, was developed under patents granted Leif Lee, consulting engineer, Youngstown, Ohio.

The construction of the Lee Air Heater itself is very simple and rugged, being built to the standards of steel mill practice. Ordinary bent steel tubes are cemented with a special metallic preparation into cast iron headers and the resulting bank of tubes enclosed in a heavy brick setting with the combustion chamber in one end, the tubes being separated from the combustion chamber by a thick bridge wall and a layer of baffle tile. In operation, the combustion gases pass around outside of the steel tubes and the air is forced through, inside the steel tubes into a distributing duct system. This is the only heat transfer that takes place.

Ten years ago the first Lee air heater was built and the original heater is still in operation with no repairs having been made to the heating elements. Since that time a great number of heaters of various types and sizes have been installed and by applying the knowledge gained from these installations we can now offer a furnace from 80 per cent to 90 per cent efficient, of standard design and suitable for coal, gas or oil firing.

Actual operating figures show that many buildings can be heated in this manner at one-quarter the cost of a steam system. This is due to the fact that the heater need be operated only when necessary. For example, on mild mornings the heater is fired for an hour or so, enough to take the chill out of the building, and then shut down the balance of the day.

Sides—Brick, mainly glass.

Roof—Precast slab.

Floor—Concrete.

Size of Bldg.—52,000 square feet.

Volume of Bldg.—1,040,000 cubic feet.

Flue—13-inch diameter.

Temperature of flue—160 degrees.

Method of air delivery—Air is passed to underground concrete duct and discharged throughout the building with Mushroom Ventilators.

Temperature maintained—65 degrees at 15 below zero.

Specifications for Warm Air Heater

The heater proper shall consist of metal heating elements encased in brick setting, of which not less than 9 inches be firebrick. The combustion chamber to be of the Dutch oven type, that is, separately placed at one side of the heater proper and to be constructed of 13½-inch firebrick walls rigidly buckstayed as in standard boiler practice and construction.

All fire, ash and cleanout doors to be of standard boiler type with substantial cast iron protecting plates on fire doors. Heavy rocking and dumping grates conforming with standard boiler practice shall be used.

The heater shall have at least 70 square feet effective metal heating surface for every 1,000 cubic feet per minute of rated fan capacity; shall have at least 1.3 square feet grate area for every 1,000 C.F.M. rated fan capacity; and when subjected to a pressure of 10 ounces all air passages through heater will remain air tight.

The fan to be of American Blower type, with sufficient capacity to deliver required amount of air to building. Fan to be placed on foundation of wood and cork securely bolted to concrete pad on the prearranged standard.

The motor to be A. C. multiple speed of standard manufacture approved by the architect and furnished complete with starting switch and control, making the whole automatically operated.

Indiana Sheet Metal Men Act to Change Method of Handling Estimates

President Bierasch of the Warm Air Heating and Sheet Metal Contractors' Association, wrote the Indiana Sheet Metal Contractors' Association recently regarding the attitude of the Indiana association toward the relations of the general and sub-contractors, having in mind particularly certain practices which work a hardship on the better class of general contractors and sub-contractors. After giving the matter much consideration, the board of directors of the Indiana association passed the following resolution:

1. All estimates shall be held strictly confidential as between subcontractor submitting same and general contractor, and the general contractor shall not divulge, nor shall the subcontractor seek to ascertain the price submitted by any other contractor. Conscientious application of the foregoing by both interested parties will eliminate the major part of the disagreeable relations existing at the present time and will prevent the practice of peddling bids and the dissemination of misleading information, both of which are used by some of the more unscrupulous general contractors in their efforts to get a low estimate.

2. Notification to sub-contractor whose estimate is used prior to the letting of general contract, and the awarding of sub-contract to the same sub-contractors whose bid is used. This method, if used in common practice, will probably result in a lowering of the overhead costs of some of our own craft who maintain a staff of gum shoe estimators who never estimate.

3. The prompt payment of all monthly and final estimates by the general contractor in accordance with the contract terms.

4. We recommend that wherever possible the Standard Documents of the American Institute of Architects shall be used as a standard form of agreement between contractor and sub-contractor.

These resolutions, framed by President Waters to voice the sentiments of the board, were adopted unanimously. While it has not been decided just what steps can be taken effectively to put the principles involved into practice, it is hoped that some action may be taken looking toward a betterment of contractural relations along the lines mentioned in the article.

Dairy Stable Ventilation Needs Make Work for Sheet Metal Man

New York State Agriculturists Giving Problem Much Consideration

By F. L. FAIRBANKS

THE subject of dairy stable ventilation has received considerable attention in New York State during the past few years and the author will discuss briefly the situation as it was understood and practiced for many years and possibly, in some instances, is today, and then describe some studies of the problem, pointing out important factors determined and describe the discovery of the effect of internal air movement on the ventilation problem.

First of all, there is the King theory of ventilation, having as its principal objective the maintenance of a certain per cent purity of air in the stable, and hourly flow for this purpose being computed as 3,545 cubic feet per head of stock of 1,000 pound weight.

A great deal of work has been done about this assumption and resulting from it are three distinct types of systems, the King, the Rutherford, and the Modified Rutherford. All three of these systems had their advocates and no one was able to prove one superior to the other, for the air usually went out of the flues at the proper rate in all cases.

The milk ordinance boards specified *adequate ventilation* for dairy stables as all the medical men agreed that fresh air was desirable. At this point, milk regulations began to require sealing the inside of dairy stables to make the walls smooth and tight for sanitary reasons.

With the remodeling of dairy stables to suit the milk ordinance rules, a big group of dairymen supplying milk to cities found that the labor and material that they had expended in improving their stables was likely to be all lost because, instead of having a stable wall which would allow moist air to pass through it more or less freely, they now had a tight wall which prevented the escape of the stable moisture. The result was that moisture collected on the ceilings and walls, window sills were flooded with water, windows swelled either open or shut, doors warped, the ceiling in some cases swelled and buckled, and, if the dairyman attempted to relieve the conditions by opening the hay chutes, the hay around the chute became wet and rotted and the underside of the roof became coated with frost which, on the next sunny day, melted and soaked the roof timbers full of water.

Thus, like many other subjects,

*Paper on Natural Ventilating of Farm Buildings presented at the annual meeting of the American Society of Heating and Ventilating Engineers by Professor F. L. Fairbanks, Cornell University.

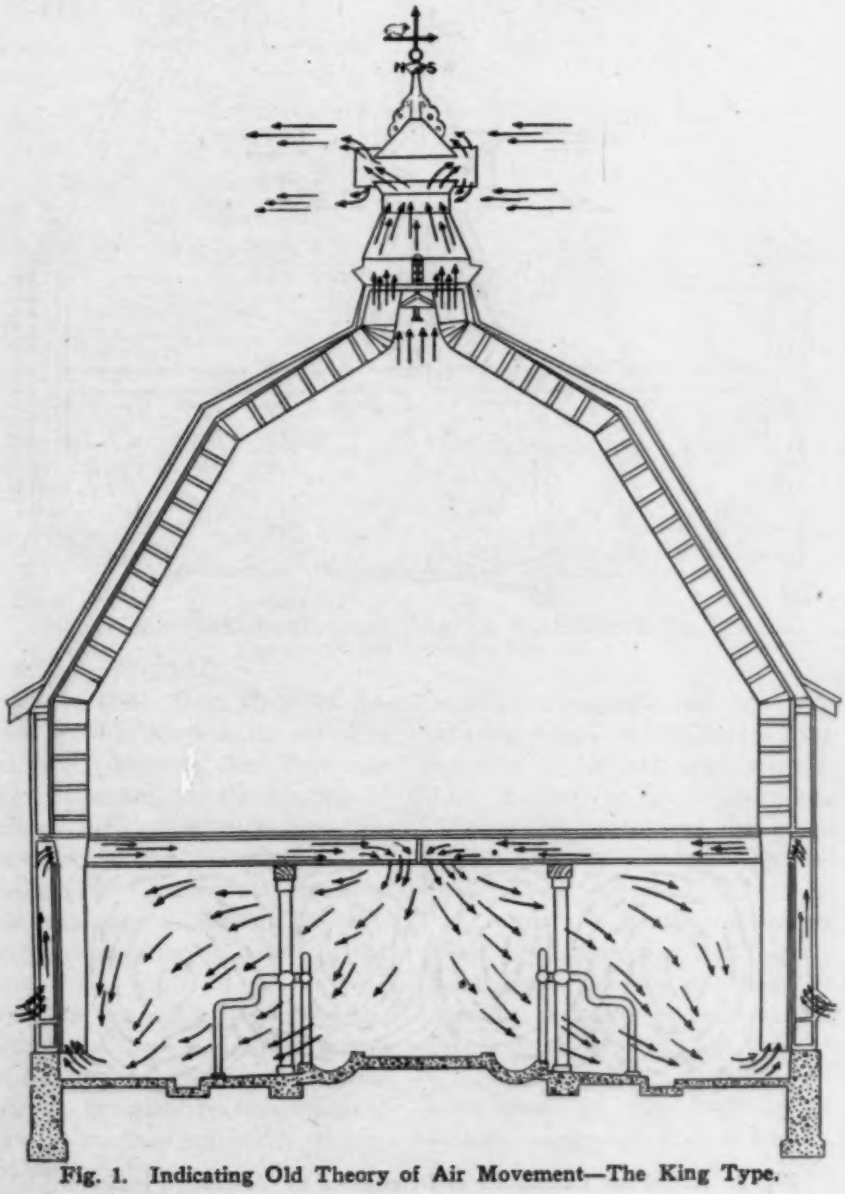


Fig. 1. Indicating Old Theory of Air Movement—The King Type.

the factor that had been considered as all important (the purity of the air in the stable) became submerged in the problem of moisture removal.

At this stage then, when commercial and home-made systems of ventilation were in operation in dairy stables and no one was satisfied and everybody was arguing about the subject and the moisture problem was getting worse in both ventilated and unventilated stables, and the commercial companies were sitting tight on their own pet theories, it was at this point that Prof. A. M. Goodman and the author, feeling like the "fools that rush in where angels fear to tread," took over the study of what seemed to be an important agricultural engineering problem—that is, the preservation of the structure of the dairy stable and the barn by the removal of excess moisture from the dairy stable.

Other factors also were in mind which were not so easy of solution or rather measurement, such as improvement in the health of the stock in connection with the T. B. campaign of the state, more efficient working conditions for the dairyman, and the installation of a system of ventilation which would relieve the dairyman of the constant manipulation of the doors, windows or flues to maintain reasonably uniform temperature, humidity and air conditions in the stable.

The first step was, therefore, a survey of the literature. This did not enlighten us much. Conferences were then held with the engineers of companies making ventilation systems for dairy stables. These conferences were interesting but not instructive.

There remained two courses of action, one to build an experimental stable and equip it with stock, etc., for test, the other to make tests in existing farm dairy stables. The latter was the only course open at the time, so a survey of the state was made and representative systems of the various types both commercial and home-made in the different dairy sections of the state were selected for test.

The ventilation of dairy stables is most difficult during the mid-winter months when extremes of temperature, wind and humidity occur. It was, therefore, decided to make the tests during the months of January and February.

There were no very definite formulae for determining the flue area for a stable, but all seemed to hinge about the King theory, and, in general, the formula developed by J. L. Strahan of the Louden Machinery Co., for a 20 degree difference in temperature seemed to fit fairly well, *i.e.*, $A = \frac{170N}{\sqrt{H}}$

in which—

A = total area of flues in square inches.

N = number of cow units, stable capacity.

H = difference in elevation in feet between the point where fresh air enters stable and point where foul air leaves outtake flue.

The factors that were thought to be important to the proper functioning of a ventilation system were:

1. Number of cubic feet of air space in stable per head of stock
2. Insulation of the stable
3. Height of flue
4. Area of flue.

Therefore, in the tests made, a check on the measurements and construction of the stable and system was taken in each case before starting the actual test.

In making the tests, it was necessary for Prof. Goodman and the author to work in 12-hour shifts each, the shift being made at 12

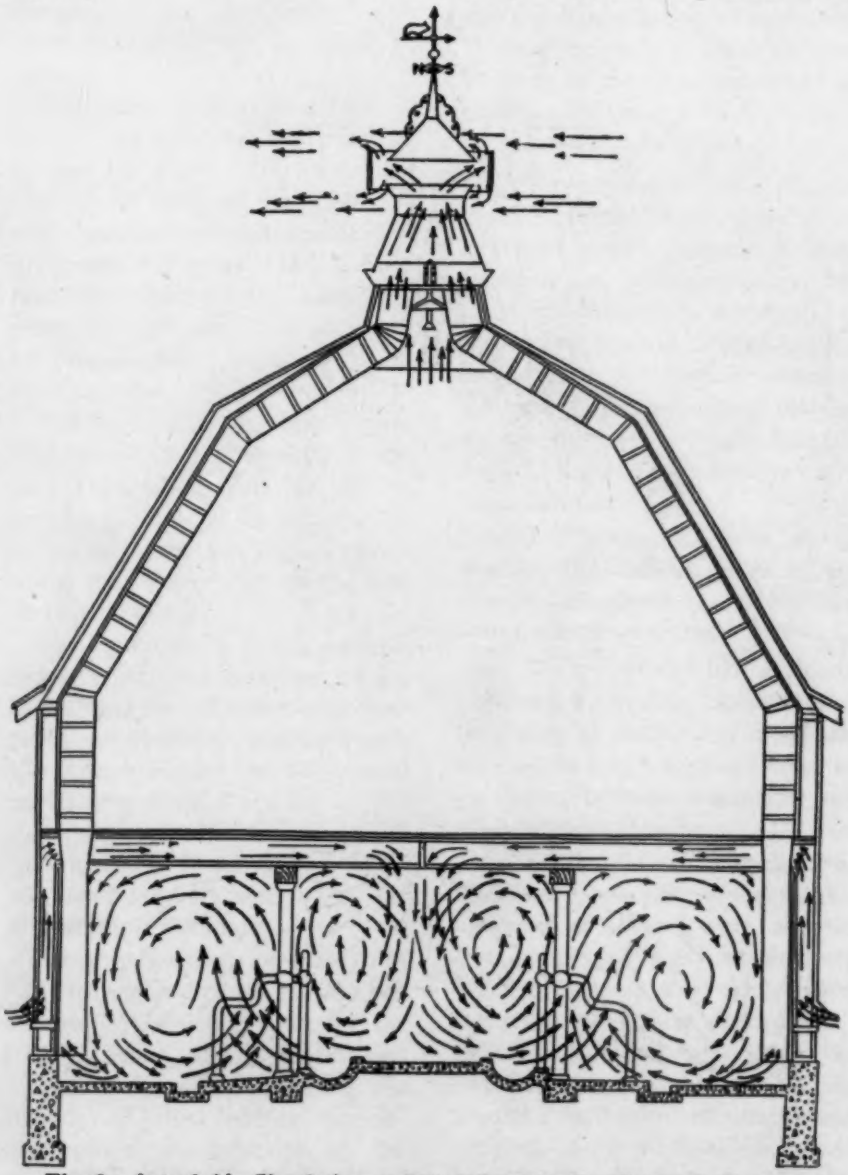


Fig. 2. Actual Air Circulation as Determined by Ventilation Indicator.

noon and 12 midnight. Each man was on duty constantly during his shift except for meals.

Recording instruments were used in the stable and out-of-doors for temperature and relative humidity measurements. The readings of out-door conditions were:

1. Weather
2. Temperature
3. Relative humidity
4. Wind velocity at ridge of barn
5. Wind direction
6. Barometric pressure.

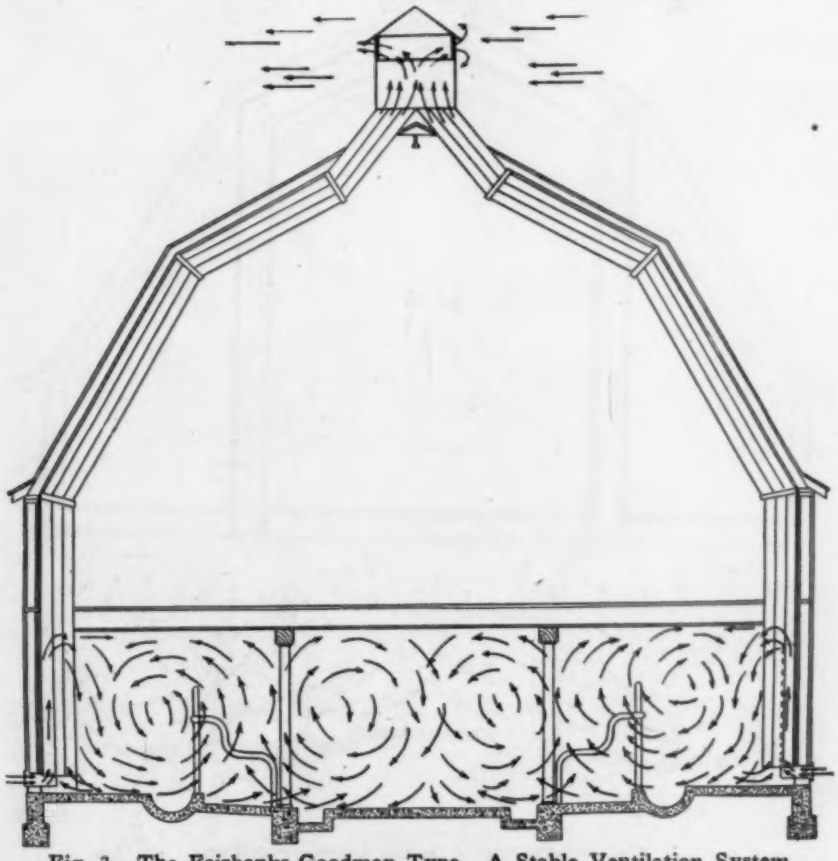


Fig. 3. The Fairbanks-Goodman Type. A Stable Ventilation System Designed from Research Results.

In the stable from 10 to 40 stations were selected at floor, ceiling and mid-points in the alleys and over the cows, for the reading of temperature and relative humidity. In addition the velocity of air through the intakes and outtakes was measured as well as the temperature at different points in the flues.

A start was made by taking readings every three hours but it was found that at times of weather changes things were happening in between readings for which no record was available.

Certain unexplained temperature and relative humidity changes were taking place for which no explanation could be found. Then, too, condensation was occurring in certain parts of the stables for no apparent reason, some parts of the stables were comparatively free from odors, some stables, with the same air movement, so far as it could be measured, were noticeably more smelly than others.

The next step was to take continuous readings throughout weather changes. This gave the missing points on the curves; still we were in the dark as to why certain stable conditions persisted. There was something going on which could be measured, but for which there was no evidence as to the cause. A number of causes could be assumed, but that was not satisfactory, for we could not be sure that our assumptions were correct.

The air flow for any type of systeem could be measured. Some systems were more affected by outdoor temperature changes than others. No very great difference in relative humidity for the different systems was noted, but some stables were more smelly and wet than others. Why? That was a question to be answered. Therefore, a study of the air movement in the stable was started.

The outtakes behaved quite uniformly. The intakes were affected by the wind and type of opening into the stables.

The air movement within the stables could not be seen but it was felt that something must be going these unexplained happenings. The usual two-bottle ammonium chloride smoker was used, but the stable air movement was so gentle that the heat from the observer's body affected the smoke drift or caused eddies. Also, blowing the ammonium chloride out of the tubes gave an initial velocity to the smoke and, therefore, was not a true indicator.

Thus necessity, which is the mother of invention, caused us to look for some device for accurately detecting the air movement within the stables and the author devised an apparatus which is called a Ventilation Indicator, for the spontaneous generation of ammonium chloride vapor and with it several puzzling points have been cleared up.

The apparatus, like many things that are of value, is very simple. In the form used for ventilation work, it consists of two concentric dishes. The bottom of the larger dish is covered to a depth of about ⅛ inch with ammonium hydroxide, the bottom of the smaller dish is covered to the same depth with hydrochloric acid. The smaller dish is placed within the larger dish and the vapors from the two chemicals immediately combine to form the familiar ammonium chloride salt.

Through the co-operation of Eimer and Amend in this work, the complete apparatus in suitable carrying case with compartments for sling psychrometer and anemometer is available so as to provide complete equipment for air movement studies.

Now let us discuss what has been

learned about the air movement in dairy stables.

The original theory, universally accepted, was that the fresh air must enter in front of the cows, that it passed by the cows' heads and bodies and should be taken out of the stable from behind the cows and that it was quite important that outtake flues should be placed at certain specified intervals because the draft created would draw the air from the stable over a limited area only.

Thus in the past the air flow within the stable was represented as in Fig. 1 which indicates the natural draft system with floor outtakes and ceiling intakes as originally devised and illustrated by King.

But what was found by actual test in all stables having this type of system is shown in Fig. 2, a strong upward movement of air toward the ceiling about each row of cows, a decided movement along the ceiling toward the wall, then down to the floor past the outtakes and back to the cows. A less decided but traceable movement occurred along the ceiling toward the center of the barn, down to the floor and back to the cows. This action was found regardless of whether the intake was at the center and the outtake at the wall or *vice versa,* although with the intake at the wall, the mixing action was more pronounced.

It was found also that if all drafts caused by leaks could be stopped, it was necessary to get closer than 4 feet to an outtake to detect any movement of the stable air to the outtake.

This seemed to indicate that the function of the outtake flue is not primarily to determine the direction of air currents by its location, but rather to act merely as an exhauster to lower the pressure in the stable leaving the factor of distribution wholly to intake location and convection currents.

This led to the belief that instead of moving fresh air past the cows, the fresh air was being mixed with stable air and the cows breathed this mixture.

As observations were continued to trace the convection currents causing this mixing action, it was found that when the action was positive no condensation seemed to occur, but that when the action was sluggish condensation was usually noticed.

Another interesting discovery was, that in stables having these convection currents most clearly marked, there was another air drift or current along the ceiling from the stanchion rows where the cows are close together to the sparsely populated box stall section of the stable and back along the floor to the stanchion rows.

The removal of moisture from the stable walls, therefore, seemed to depend mainly on this convection current mixing action and the more positive it was, the more uniform were the stable conditions.

The circulation past the walls was the downward sweep of a convection current in which the upward sweep was induced by the heat from the cows. With a given quantity of heat available, the intensity of this movement could be increased only by accentuating the chilling effect at the walls. If this were accomplished by reducing unduly the wall insulation, a general and undesirable lowering of stable temperature would result. The chilling effect of the incoming air, however, is unavoidable and it, therefore, became evident that advantage should be taken of this means to stimulate the convection currents.

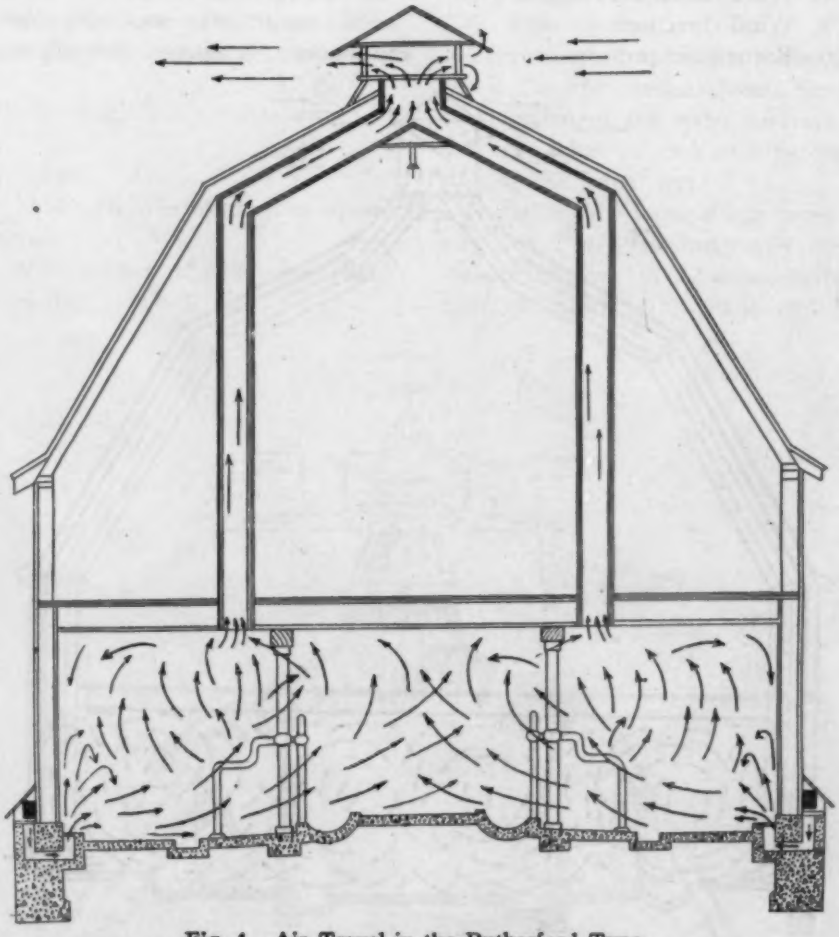


Fig. 4. Air Travel in the Rutherford Type.

It was decided to do this by arranging the intakes to admit the entering air at the stable walls and this feature based on the reasoning just given constitutes the most distinctive characteristics of the Fairbanks-Goodman system. The thorough diffusion resulting from this feature makes possible the other main characteristic of the system, which is that the floor outtake flues may be located as dictated by constructional convenience.

It has been proved to our own

satisfaction that the floor outtake was more desirable than the ceiling outtake because of the very much better temperature control due to the large volume of warm air held in the stable by the floor outtakes,

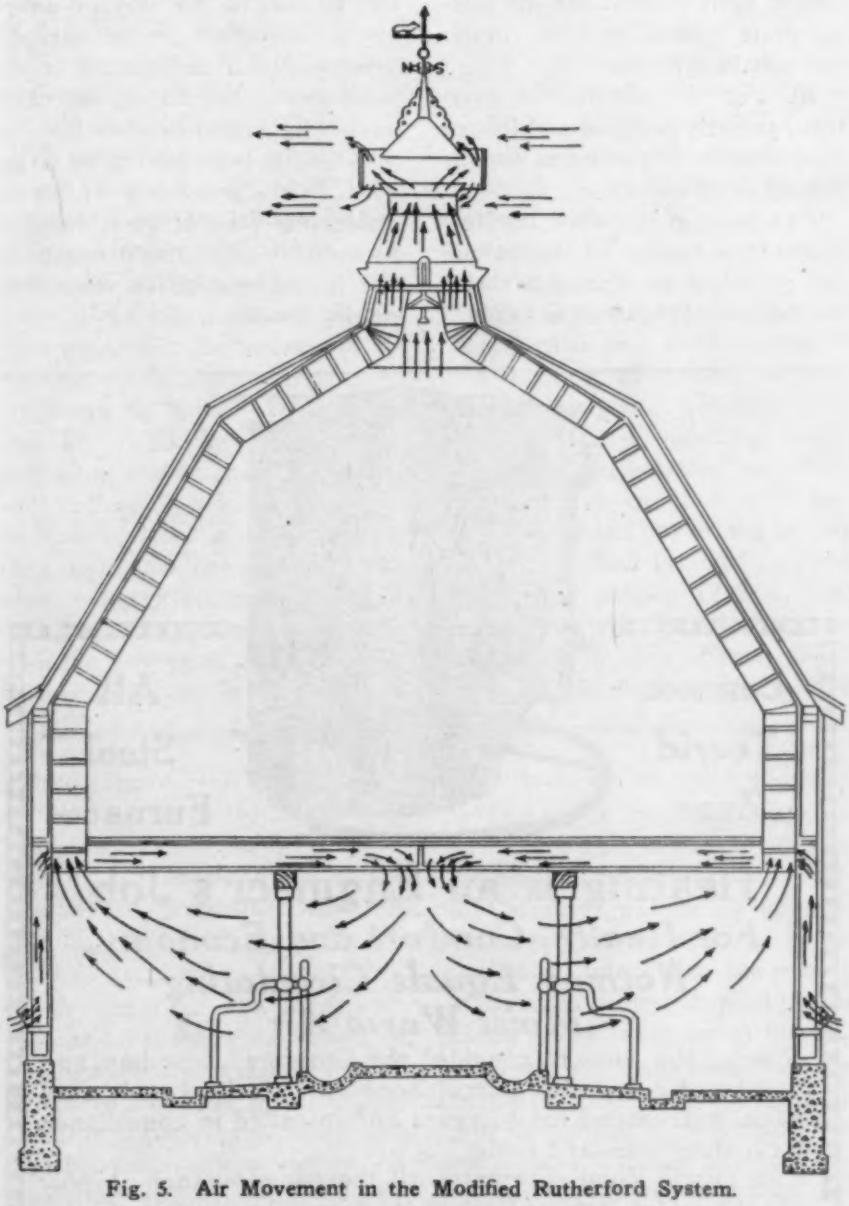


Fig. 5. Air Movement in the Modified Rutherford System.

this volume acting as a heat reservoir which made sudden changes in temperature impossible.

The establishment of the importance of convection currents in stable ventilation would also eliminate the necessity of relating the design of the system to the direction in which the cattle face, with heads in or out, which, under the old theories, was considered a limitating factor.

With these facts and assumptions in mind, it was thought possible to design a system that would—

1. Completely and continuously mix the fresh incoming air with the stable air throughout the entire stable.

2. To prevent the condensation of moisture on the stable walls. These walls to be only moderately well insulated.

3. Remove foul odors and gases at such a rate that the air would be sweet and comfortable to breathe.

4. Maintain reasonably uniform temperature in the stable throughout the winter season.

5. Prevent freezing in the stable, without the use of artificial heat, while adequately ventilating the stable.

6. Function satisfactorily with a full stable or with 70 per cent or even 60 per cent capacity.

7. Allow the placing of the intakes on the side walls regardless of which way the cows face.

8. Permit location of the outtake flues wherever convenient to put them.

9. Function with the minimum of attention from the dairyman.

Such a system was built in a very ordinary 20-cow barn. Three walls of the stable was double boarded and sealed, while one wall next to the bay floor was a single boarding with roofing paper over it to stop the cracks. The wall insulation was thus below the average. There was only one outtake located at the point most convenient for construction and four intakes along two walls located to stimulate convection currents.

The operation of this system was most satisfactory and proved that the objectives previously stated were quite possible of attainment.

One might think that the complete mixing accomplished by the convection currents would saturate the stable with foul odors but it was found that with the proper flow of air through the stable and the high degree of air purity maintained, the air was not only free from unpleasant odors but was noticeably sweet with the odor of hay and pleasant to work in.

The Rutherford system with ceiling outtakes and floor intakes, which we have not had an opportunity to test as thoroughly as possible, is the other principal type of system and gives a diffusion of air somewhat as indicated by Fig. 4. It gives fair diffusion, but is subject to localized effects of outtake flue and when extreme cold periods of below zero temperatures occur the system has to be closed off, thereby destroying the ventilation effect.

The Modified Rutherford system using ceiling outtakes and ceiling intakes, Fig. 5, has been tested thoroughly and it has been found that there is a tendency for the incoming air to short circuit as shown by the arrows. Pockets of foul air are apt to occur and the system

shows an extreme sensitiveness to weather changes.

With the ceiling outtake type and especially with the ceiling outtake and ceiling intake type of system, it is impossible to maintain uniform conditions throughout the stable at low temperature periods the flow of air must be materially reduced and, at times, stopped to prevent freezing in the stable.

There are at present four types of systems of natural draft ventilation for dairy stables: the King, the Rutherford, the Modified Rutherford and the Fairbanks-Goodman type.

All of these systems are in use today and all of them are an improvement over no ventilation at all, but, like some other things, some of these systems are better than the others.

In concluding, please let it be emphasized that, from the studies of the air movement in stables, the essential factors in dairy-stable ventilation are found to be:

1. A heat reservoir should be maintained in the stable by means of floor outtakes if we are to secure temperature control.

2. Convection currents should be stimulated.

3. The positive action of these convection currents will give us complete mixing and diffusion of the fresh incoming air, uniform air conditions throughout the stable and will prevent the accumulation of condensed moisture on the walls or ceiling.

4. The stimulation of the convection currents is materially assisted by locating the intakes on the side walls.

5. Drafts are avoided by destroying the velocity of the incoming air as it enters the stable, thus making it fall of its own weight through the warm stable air.

6. By accomplishing complete mixing of the fresh air and stable air, we are able to locate the outtakes wherever it is most convenient to construct them, thus keeping the mow and stable free of obstruction.

7. No intake should be closer than 6 feet to an outtake.

8. From 50 to 60 cubic feet of air per minute per head of stock is sufficient to adequately ventilate and maintain a sweet, dry stable.

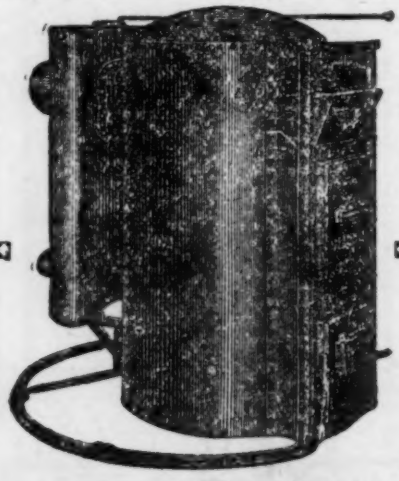
9. These factors apply to both natural draft systems and mechanical draft systems such as electric fan outtake systems.

10. For the electric fan systems, properly designed and located intakes are as important as for the natural draft systems.

As a result of this work, the New York State College of Agriculture has published an Extension Bulletin, Number 151, which is intended to give the dairyman a better knowledge of the problems of ventilation of the dairy stable and to aid him in the selection of a system for his needs.

It is felt that much more work can be done in the way of determining the effect on the cattle of ventilated and unventilated conditions and in determining the exact amount of insulation needed.

What has been determined in regard to the movement of air in stables has been of great value to us and it is hoped that it may be of use in the solution of other ventilating problems.



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For Health, Comfort and Economy, Nothing Equals Circulating Moist Warm Air

Now is the time to consider the Comfort, Economy and Safety of a Lennox Torrid Zone (all steel riveted) furnace, guaranteed for 10 years and installed in compliance with the "Standard Code."

The Torrid Zone eliminates all the dangers, such as poisonous gases, smoke and soot, which leak through the many sections and cracks so common with all Cast Iron Furnaces.

We will gladly send one of our Engineers at your convenience, to show you how easy it is to enjoy real Comfort and Economy with Circulating Moist Warm Air.

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NEW CHICAGO CODE ORDINANCE AND AMENDMENT FULLY EFFECTIVE MAY 18, 1928

NOTICE to all contractors and others engaged in the business of installing, altering, or repairing gravity warm air heating plants!

By the provisions of an ordinance passed December 28, 1927, and amended April 18, 1928, appearing on pages 1663 to 1668 and on pages 2682 and 2683 respectively of the Journal of the City Council, all persons engaged in the business of installing, altering, or repairing gravity warm air heating plants within the City of Chicago shall, by the provisions of Sections 7, 8 and 9 of said ordinance, before engaging in such work, apply for registration to the Commissioner of Buildings, who shall collect a registration fee of $50.00 and cause such person to file with the City Collector of the City of Chicago a bond in the penal sum of ten thousand dollars.

Each such contractor or other person engaged in such business shall also obtain a permit for each installation, alteration or repair, and a permit fee of $5.00 will be paid for said permit.

Section 12 of said ordinance reads as follows:

"Penalty: Any person, firm or corporation that shall engage in the business of a warm air furnace heating and installing contractor without obtaining a certificate of registration as herein provided for, or that shall violate any of the provisions of this ordinance, shall be fined not less than fifty dollars ($50.00) nor more than two hundred dollars ($200.00) for each offense, and a separate and distinct offense shall be regarded as committed every day on which such person, firm or corporation shall continue to operate contrary to the provisions of this ordinance."

An application blank is available which furnace installers will kindly fill out and return same with the registration fee of $50.00 to the Commissioner of Buildings, Room 702, City Hall, Chicago, at earliest date possible.

Upon receipt of your application, a blank form of bond will be sent to you, which after being properly executed and approved will be filed in the office of the City Collector and a certificate of registration returned to you.

(Signed) CHRISTIAN P. PASCHEN,
Commissioner of Buildings,
City of Chicago.

Discussion on this paper during the meeting is quoted as follows: Professor A. C. Willard, President-elect of the American Society of Heating and Ventilating Engineers, gave his views on the paper as follows:

"The paper is most interesting. Professor Fairbanks has shown us in our work at the University of Illinois in the study of circulation of air in experimental houses and experimental rooms a method of generating without initial velocity ammonium chloride fumes for the study of air currents. We are using the exact apparatus that Professor Fairbanks has here, these double dishes of ammonium hydroxide, and by using them on a vertical standard, three sets of dishes, at floor, breathing line and ceiling height, we have discovered most unusual conditions of air flow, at these very low velocities, which exist both in indirectly heated rooms heated by warm air furnaces, and rooms which are heated by direct radiation with steam or hot water radiators.

"One of the surprising things we have discovered in connection with the multiple arrangement on a vertical standard was the air flow between two rooms connected by an open door. In one room the amount of radiation or heat supplied was in excess of the requirements for that room and in the adjoining room the heating requirements were not quite satisfied for that room. There was not only a circulation established between the two rooms through the doorway, but we have discovered there are three or even four different currents that flow through the doorway; one coming from the overheated room into the cooler one; one coming back across the floor line in the reverse direction with direct radiation, and a third circulation at about the middle plane of the two rooms. This latter case was most pronounced in a warm air furnace installation. We never suspected this secondary circulation which goes on in the upper part of a room until we tried out these very delicate air drift indicators. We have tried a great many air drift indicators, but practically all of them give some initial velocity to the jet. They require the presence of the operator in the immediate vicinity of the jet or the smoke fumes, the result being that the initial impetus given to the source of smoke vitiates the evidence that the jet seems to present.

"I don't want to belittle the contribution Prof. Fairbanks has made in the field of barn ventilations, but this air drift indicator is one of the most important aids to the man making a study of air currents that has come to our attention in the field of heating rooms by direct or indirect systems. The investigator who overlooks the visual evidence which he can secure by the use of smoke fumes of some sort has overlooked a most important thing in his study of heating and ventilating problems. I want to thank Prof. Fairbanks for having prepared the

paper, in as much as he showed us a method of arriving at results we never could have secured otherwise."

H. P. Gant: "May I ask Prof. Willard in which direction the third air flow was found to go?"

Prof. Willard: "Usually in the exactly opposite direction from the one that is flowing on the floor in the case of a warm air furnace installation. We have found further that in a directly heated room with direct steam or hot water radiators placed at the window the air currents naturally rise to the ceiling, go across the ceiling in a thin layer to the inside wall, do not drop to the floor, but begin to come back toward the outside wall within a distance of 12 to 18 inches or less from the ceiling. In the upper part of the room, down to the height of the chairs, desks and other furniture, you will have a circulation that will be quite independent, possibly, from the circulation at the floor line."

The Fox Furnace Company Announces a New Line of Sunbeam Furnaces

An indication of the great strides forward being made by the warm air heating industry is found in the recent announcement of a new and improved line of Sunbeam furnaces by The Fox Furnace Company, of Elyria, Ohio.

The progressive spirit of furnace manufacturers, as evidenced by marked improvements in heating plant design and construction, in combination with the spreading knowledge of the Standard Code and its beneficial effect on installation methods and practices, augurs well for the future success of those who are most vitally concerned with the ultimate prosperity of warm air heating.

Cleaner heating is one of the major claims advanced for the New Sunbeam warm air furnaces, which will be known as the 1,000 Series. It is based on the elimination of more than twenty (20) linear feet of joints in the warm air chamber. Radiator, smoke collar and cleanout are cast in one piece. Both feed section and ash pit openings extend outside of the front of the furnace. No longer can gas or dust from these parts escape into the warm air runs and arouse the antagonism of housewives.

One improvement is the heavier castings and the fact that the heating unit is perfectly centered. From the strong one-piece base which insures a firm, level setting for the furnace, to the newly-designed one-piece radiator, the new "1,000 Series" Sunbeam furnace is built for many years of service.

Dealers and home owners have a choice of two grates, both operated by an upright shaking lever, which has a unique locking device to keep the grates in the proper position. Boiler, or rocking, grates—flat, or dumping, grates—whichever happen to be preferred, are available. Simplicity of assembly and ease of installation and removal are incorporated in both of these types. There are no bolts; only a single cotter pin to be inserted or removed.

Warm Air Heating Conference To Be Held in Lansing, Michigan, May 17.

A warm air heating conference is to be held at the Olds Hotel at Lansing, Thursday, May 17th. This is a very important meeting and every heating contractor or salesman in Michigan should be present to assist in arriving at a proper plan for the adoption of the National Standard Code, according to Secretary F. E. Ederle of the Michigan Sheet Metal and Roofing Contractors' Association.

A representative of the National Warm Air Heating Association, together with representatives from cities now operating under a code ordinance, will be present. These men will give valuable information on the results of code legislation.

The conference will be a one day affair. The morning session will start promptly at 10:30 a. m. and the afternoon session at 1:30 p. m. Following the afternoon session a meeting will be held of the committee which is to consist of one member from each city or town represented. This committee will attempt to work out a state-wide program which will be submitted to the local associations for adoption.

V. H. Harshbarger Becomes Furnace Salesmanager of the Favorite Stove and Range Co.

V. H. Harshbarger was elected furnace sales manager of the Favorite Stove & Range Company, Piqua, Ohio, at a special meeting called at the home office April 30. Mr. Harshbarger has been with the company in the capacity of heating engineer for the past three years.

Thrift—Saving of Time, Energy, Ability—Not Just Dollars Important

Some count their profits in dollars and cents; their losses, the same way; yet all profits can't be figured on an adding machine. Dollar and cents profits are important, for being basically animal, we must eat, and money is essential. Yet is it the chief essential; are there not profits that are of greater value which can be garnered as we travel along the work-a-day road?

The job well done—there's a profit in that in contentment and satisfaction which exceeds the pay we get for it. Accomplishment, more than virtue, is its own reward—paying us dividends in increasing amount as our accomplishment increases.

Encouragement—extended to the other fellow. Profits are returned tenfold on such an investment. Not so much in his thanks as in the satisfaction of seeing him gather together his courage that was being scattered to the four winds by disappointment.

Thrift—not just the saving of dollars, but of time, energy, ability; a sturdiness of character results that pays compound interest daily.

Joy—well, why continue?

Profits are richest when they come from the intangibles rather than from stocks and bonds in the bank.

Putting Furnace Industry On Business Basis—

IN a recent issue of AMERICAN ARTISAN I called attention to the fact that the National Warm Air Heating Association, at its annual convention in the Stevens Hotel, Chicago, had for the first time made it possible for the cooperative members (new name for associate members) to offer suggestions for the betterment of the industry through the establishment of the Better Business Committee. I also urged cooperative members to take advantage of their opportunity by offering the Better Business Committee their thoughts and ideas on betterment ways.

L. M. Burt, President of the Greater Chicago Warm Air Heating Association, has come forward with the first suggestion of that nature and it concerns itself with the method of handling inquiries that come to the office of the national secretary from the national association advertising.

Heretofore these inquiries have been sent to the member manufacturers and by them farmed out to their dealers in the territories of origin. The inquiries got into the hands of dealers without regard to whether these dealers were associate members of the national association or whether or not they signed the Code Pledge card. This practice resulted in having so many dealers and "alleged" dealers call on a prospective furnace buyer that the latter was pestered to death and practically driven to competitive systems in an effort to escape. Here exists a condition which sorely needs attention.

The suggestions which Mr. Burt makes are:

1. That instead of giving the inquiries to the various member manufacturers, they be sent to the secretaries of the local member associations in the several localities in which the inquiries originate, who would report back to the association promptly the result of dealer's calls on prospects—giving the association valuable data on their advertising heads.

2. Make cooperative membership in the National Warm Air Heating Association necessary to membership in the local warm air heating association by signing the Standard Code Pledge card and paying National Warm Air Heating Association dues.

3. Have requirements to membership in the local association that would be virtually an examination into the installer's ability to put furnaces in according to the Standard Code and test his knowledge of good business conduct. In other words, build a fence around the inquiries originating from national advertising that would insure their getting into the hands of furnace installers only who have proved themselves fit subjects to represent the warm air heating industry in a manner to reflect credit to that industry.

This would encourage the formation of local associations and would increase the cooperative memberships in the national association. It would place a premium upon such membership. Then the association emblem displayed in the installer's window and on his stationery would mean something. Best of all it would encourage study to qualify for membership, just as the exacting requirements for admission to the practice of law and medicine make embryo lawyers and doctors study. The industry would benefit. Prospects for warm air heating systems would not be pestered to a point where they are ready to set their bull dogs on the warm air heating salesmen, the former having been gullible enough to make inquiry about the merits of a warm air heating system.

The member manufacturers may feel that inasmuch as they are paying for the association advertising, they deserve the right to make whatever disposition of the inquiries they see fit. True enough, but when it is found that the disposition they are making of the inquiries is working to the detriment of the entire industry, it would seem that they could well afford to dispense with their individual rights for the greater common good of the industry.

Then, too, what about the associate or cooperative members? Do they deserve no consideration? If the manufacturers are to send these inquiries out to code and non-code dealers indiscriminately, then why should a furnace installer pay his $10 for a cooperative membership? Presumably he paid for a preferred seat, which under the present method of farming out inquiries he is not getting.

Mr. Burt is on the firing line and knows whereof he speaks. The suggestions he offers are excellent and deserve full consideration by the Better Business Committee.

George J. Duerr

EDITOR

Random Notes and Sketches
By Sidney Arnold

"The essence of humor is sensibility; warm, tender fellow-feeling with all forms of existence."—Carlyle.

Barber: "Were you ever here before? I don't remember your face."

Steven S. Tuthill, American Zinc Institute: "No, you wouldn't. It altered greatly as it healed."

* * *

I had the extreme pleasure in Cleveland, Ohio, this week of meeting Mr. Tuthill personally and I want to assure my readers that my repertoire of good ones was extensively enriched by the contact. I also met Mr. Patterson, Mr. Rogers and Mr. Knisely of the Sheet Steel Trade Extension Committee, who are now located in their new home in the Terminal Tower Building, Cleveland. It was my pleasure also to have the company to and from Cleveland of J. A. Brandt, and Verne H. Bird, head of the Sheet Metal Department, and Director of Education, respectively, at Mooseheart, and H. J. Dettmers, President of the Associated Sheet Metal Employers of Chicago.

* * *

She "Tempted" the Judge

A local justice of the peace had a negro girl witness appearing in his court the other day. The maid sat down. She crossed her limbs.

"Pull down your dress," said the judge.

"I can't, Jedge. I dresses jes' like white gals."

"You are fined five dollars for contempt of court," said the judge. "Pay it to the clerk."

The maid went to the clerk and offered him five dollars.

"What's this for?" asked the clerk.

"For tempting the jedge," said the maid.

* * *

He Was Sharp

An old man heard of a famous surgeon who could restore youth by performing a gland operation.

Going to the physician, the old man said:

"Could you make me seventeen years old?"

"Certainly I can," the surgeon responded, and the operation was performed.

Several months later the doctor sent a bill.

"Nothing doing," the patient responded. "I am under age and you cannot sue me, and if you say I am not under age, I'll sue you for fraud."

* * *

Tried by Proxy

During the heat wave last Friday Judge Dunham was discussing with a few club friends the question of summer drinks and he admitted that he did not know of a good thirst quencher.

"Have you tried gin and ginger-beer?" asked one of the group.

"No; but I've tried many people who have!" was the witty response.

* * *

Short

She: "When I was born, my father agreed to give me $10 each birthday, and now I have $230."

He: "How much does he still owe you?"

* * *

A New Bank

"Since I bought a car I don't have to walk to the bank to make my deposits."

"Ah, you ride there?"

"No, I don't make any."

* * *

Difference Between Male and Female

The family were sitting around the fireside. Mother was knitting, father reading the newspaper, and the boy was studying the words.

"Dad," the boy asked, "what is a fiance?"

"A woman who is engaged to be married."

"Then what is a fiasco, dad?"

"Oh, that's the fellow who is going to marry her."

* * *

The Following Rules Are Suggested Additions to Auction Bridge

Some of my readers I know are addicted to the well known game of bridge and will appreciate these helpful rules:

1. Pick up the cards as dealt, you will be ready to bid ahead of others.

2. If your hand is rotten, mention it. It will guide your partner in his bid and play.

3. If your partner bids first, do not hesitate to raise; he has to play it.

4. Never hurry. Try several cards on a trick until you are sure of which one you prefer.

5. Occasionally ask what are trumps. It will show you are interested.

6. Do not show lack of interest when you are dummy. Help your partner out with suggestions.

7. Talk about other subjects during the game. It makes for good fellowship.

8. Feel free to criticise your partner's tricks. He will be much better as a result.

9. Always trump your partner's trick. Never take a chance.

10. Do not try to remember the rules. It is too confusing.

11. If it is a money game, always stop when you are ahead. Folks will remember you better.

12. Always explain your play, particularly when set. It shows up your card knowledge.

13. Disagree with the established rules and conventions. People will know your card knowledge and that you have an independent mind.

14. Eat chocolate creams and other adhesive candy while playing. It will keep the cards from skidding.

* * *

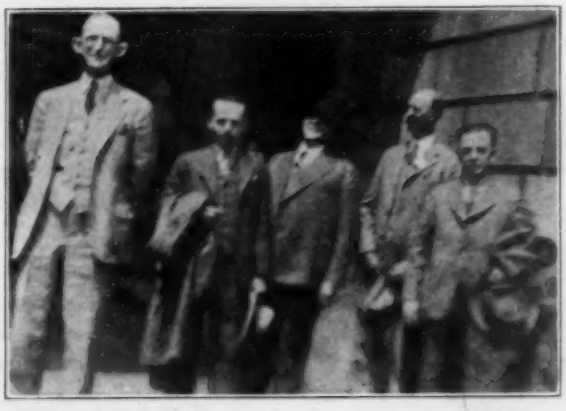
It is not doing the things we like to do, but liking the things we have to do, that makes life worth living.

Metal Branch Holds Successful Meeting in Boston

Much Work for Good of Industry as a Whole Accomplished

By M. M. Dwinell

WITH attendance of around 110 members and a serious desire to cover more efficient methods of distribution, the Metal Branch of the National Hardware Association enjoyed on May 3rd and 4th at Boston one of the best sessions of its 17 years.



Karl Roth, Edmund P. Severns, E. H. Hoffeld, M. L. Wolfe, and Lee Gillespie

"We desire and must discover most efficient ways of doing things. We want to eliminate every unnecessary step in the distribution machinery so that our products may be sold, if possible, for less," said F. O. Schoedinger, the chairman of the Metal Committee, in opening the meeting.

After the announcements of W. T. Ryan (of E. P. Sanderson Co. of Boston), the chairman of the Entertainment Committee, and an address on "Business and Financial Conditions" by C. F. Weed, a Boston banker, the floor was given to George H. Charls, president of the National Flat Rolled Steel Products Association. This is a new association combining activities of the National Association of Sheet & Tin Plate Manufacturers, the Hot Rolled Strip Steel Institute and the Cold Rolled Strip Steel Institute.

It is the purpose of Mr. Charls' association to study the facts relative to the distribution of sheets and strips, hoops and bands through the jobbers and to find the best solution for their problems. His talk considered several interesting topics as follows:

Conditions In the Steel Industry

The average return on capitalization in 1927 was 5.22 per cent, which was the lowest in recent years. While production declined less than 8 per cent from the high record output of 1926, earnings declined 24 per cent.

A typical group of 19 industrial companies had an average return of 18 per cent on capital invested (compared with 5 per cent in the steel industry).

Iron and steel prices are now 38 per cent above 1913, while wages are 125 per cent above that level.

It is to the disadvantage of the country for steel prices to be beaten down because that would require a drop in wages which will be indeed bad for the prosperity of the country, said President Charls.

The Secret Rebate

"We must not forget that the secret rebate of today is the published price of tomorrow; that he who wantonly cuts the price to one, will cut it to all; that the habitual price cutter is buying his orders—that he is not selling service, profits or prosperity. An order taker was a merchandising prince as compared with this new order buyer," said Mr. Charls.

(Note.—We quote this verbatim as it seems so important.)

Competition Between the Mills and Jobbers

A delicate subject, yet nothing would be gained by avoiding the issue if ways and means are ever to be evolved which will bring about a betterment.

Some mills started as jobbers and their policies of today are the result of causes dating back beyond the life of many jobbers.

M. M. Riter, Z. T. Hall, F. J. McNieve, R. L. McHale and Q. W. Wales

Under some circumstances it might be argued that many jobbers had forced some mills into the jobbing business, first by failing to warehouse complete stocks, and second by becoming interested in sub-

stitutes for iron and steel and sacrificing their identity as loyal, constructive distributors of these products.

"Although the National Association of Flat Rolled Steel Manufacturers has not really started to function—it seems not amiss to state that much can be accomplished in harmonizing the purposes of the jobbers and the mills if each can in some way be assured of the sincerity and allegiance of the other."

Simplification

With the assistance of the Department of Commerce the problems of simplification of gauges and sizes of sheet steel have been considered. The consequent conservation of valuable warehouse space and decreased inventory and overhead will all help reduce the cost of distribution.

Owen Geraghty, H. N. Taylor, George A. Fernly, Walter Donlevy and Nathaniel Dotehi

Light Gauges

Mr. Charls urged the association to favor elimination of flimsy gauges of roofing pipe—hurtful to continued use of iron and steel for these purposes—and also distribution of galvanized seconds which are not so labeled as such. He also urged approval of the simplification program.

Trade Extension

The Trade Extension campaign of the past few years has not been responsible for all, but surely for a very large percentage of the tremendous increase in the demand for sheets. They intend to apply the best known methods to the creation of a steel consciousness in the minds of the public.

Will the jobbers assume the duty and obligation of attending to the dealer distribution which is so essential to the success of this campaign?

He suggested that the jobbers declare themselves to the mills as being ready to put even greater efforts along these lines.

An Optimistic Note

There is every reason to believe that the volume of business will average good over a period of years. "Let us realize that the success of each concern is dependent upon the trend of its particular industry," and Mr. Charls closed his address with a plea for "courage" in fighting a clean but strong business battle.

Colwell on Simplification

H. R. Colwell of the Division of Simplified Practice of the Department of Commerce at Washington advocated wider adoption and use of standards, and frequent audit of the usage of existing or recommended standards.

He mentioned the thin roofing sheet which was blamed for often giving a black eye to metal roofing. The Sheet Steel Extension Committee recommended the use of none lighter than 28 gauge and he cited a report that some manufacturers are hurting the situation by again furnishing lighter gauge material for roofing.

Improving Relations Between Distributors

Chapin E. Harris of Brown-Wales Co. of Boston urged the "need of a program which will maintain the jobber in his rightful place in the community, eliminate destructive competition, and develop a sales and service policy of friendly cooperation which will result in a square deal for everyone, and mutual respect and the opportunity of profit for all. An intelligent policy and not a sentimental policy."

"If we are going to reduce our costs and increase our profits, we must cease using costly service as a sales lever."

Among statistical data which might be collected, he suggested:

Delivery costs per ton handled.

Sales costs per ton and per customer, etc., etc.

Standardization to reduce number of sizes and classifications necessary for warehouse stock would also be helpful.

Group negotiations with manufacturers on mutual problems are helpful.

"Uniform methods of instructions to salesmen, relating to sales policies, would go far to eliminate misunderstandings and errors."

Business is not cold blooded and unsympathetic. Frequent conferences will develop friendly relations and eliminate distrust.

Mill Direct Shipments

Discussion of this subject was in charge of Robert H. Lyon of Baltimore. This is most interesting to mills, jobbers and retailers. The opinion seemed to prevail that direct shipping is a most serious menace.

Simplification Committee

W. L. Latta of the Wheeling Steel Corporation, as chairman of the Sheet Steel Simplification Committee, reported regarding the roofing portion of the Sheet Steel Simplified Practice Recommendation of the Department of Commerce. The committee recommended:

The publication of standard gauges and sizes in a separate Simplified Practice Recommendation, to be called, "Sheet Steel Roofing."

That the present portion as applies to roofing and siding be republished without change.

That the following paragraph be added as part of existing standards:

"Standard weight subject to the

usual mill tolerances of 2½ per cent plus or minus."

Eaves troughs and conductor pipe and their maintenance were discussed at some length. Likewise a report of Terne Plate Simplification Board of Review and one on how to increase the use of terne plate. Chairman Shoedinger made a spirited address on the high value of terne plate roofing and the opportunity that exists for increasing the sale of this style over inferior style.

Robert H. Lyon of Baltimore (Lyon, Conklin & Co., Inc.) favored efforts to secure lower rates of insurance for metal roofing as compared to "so-called" non-combustible roofings, which would increase terne plate business.

Mention was made of lack of apprentices and faulty application of this roofing through inexperience.

H. N. Taylor (N. & G. Taylor Co.) sees no falling off in sale of terne plate sales although several others had experienced such a decline. Mr. Taylor mentioned certain sales helps which he would be glad to furnish to anyone interested.

W. D. Donlevy, president of the National Hardware Association, said that it was partly through this organization that the Trade Extension advertising was started originally, and he moved that the secretary be instructed to write to the manufacturers of terne plate asking them to advertise the advantages of terne plate.

Profits from Sales

A. L. Philbrick (of the Congdon & Carpenter Company), chairman of the Overhead Expense Committee of the National Hardware Association gave some very interesting statistics on the profits actually made by seven different metal distributors during the year 1927.

He mentioned the 3 legs of the "three-legged stool" of profits. These factors are selling price, cost of goods, total expense of doing business.

The average of all the jobbers in the review made only a very small fraction over 6 per cent on their money. Of the 7 firms, five made under 6 per cent, but two were making over 6 per cent. If jobbers will determine to do less business but at a profit rather than a volume at a loss, they will succeed.

"The Process of Rolling Continuous Sheets" was the subject of an interesting talk by G. F. Ahlbrandt of the American Rolling Mill Company.

Free Truck Delivery

Most sections of the country are not giving free truck delivery outside of limited territories. The New England situation was quite interesting and is doubtless influenced by the large number of cities and towns in a limited territory.

Direct Mill Shipments Again

This time it was Karl Roth of Braden Manufacturing Company of Terre Haute who lead the discussion. How to convince all factors of the trade that the wholesaler who does the warehousing and other expensive work should be given more consideration in the sale of carload lots to the occasional or "once in a lifetime" big purchaser! A program of education along this line is needed or the jobber is in peril, was the general sentiment expressed.

On the other hand the jobber should protect or help the mills by paying some premium for less than carload shipments.

Elected Again

The terms of certain members of the Metal Committee expired this year, but Ed. H. Hoffield and his associate members on the nominating committee liked them so well that they renominated them and they were reelected to serve until 1931. They were L. D. Mercer, Central Alloy Steel Corporation; F. J. McNeive of W. F. Potts, Son & Co., Inc.; John Follansbee of Follansbee Brothers Co.; G. F. Ahlbrandt of American Rolling Mill Co., and W. T. Ryan of E. P. Sanderson Co.

The Banquet

On Thursday evening was held the annual banquet of the association. A goodly crowd enjoyed the food and the remarks of Rev. Dr. Mark of Boston. On Friday afternoon a number of the visitors took a sightseeing trip about Boston, reviewing the historic places they studied about when boys.

Next Year

Cincinnati, through E. H. Hoffeld, invites the convention for next spring and this matter will be decided by mail referendum of all members. The next meeting will be at Atlantic City this fall.

New members elected to the Metal Branch during the Boston meeting were: Finucane & Macfie, Inc., New York City; Merrill & Usher Company, Worcester, Massachusetts; Haffmon, Schofield, Bruce & Cook Corporation, New York City; Taunton-New Bedford Copper Co., Taunton, Massachusetts.

A. R. Stevenson Joins Selling Staff of Tinners Machinery Co., Chicago

On May 1st A. R. Stevenson, who is known to the sheet metal trade as "Steve," joined the sales force of the Tinners Machinery Company, 100 South Jefferson Street, Chicago, Illinois.

"Steve" is well known to the trade, having sold machinery and tools to the sheet metal contractor for some years past.

In his new connection Mr. Stevenson will work with Ben and Joe Weiss, who are expanding their facilities to serve the sheet metal trade even better than in the past with both new and used machines and tools.

The Tinners Machinery Company are representatives for the Pexto, Whitney, Unishear, Dreis & Krump and other well known lines of sheet metal machines, hand tools and shop supplies.

University Sheet Metal Works Now in New, Larger Home

The University Sheet Metal Works, Inc., 135 East 12th Street, St. Paul, Minnesota, are now in their new home located at 981 University Avenue. The new plant consists of larger facilities than the former location gave and the company is equipped in every way to meet a greater demand for its services.

KITCHEN SINK COVERING WITH NICKEL ZINC

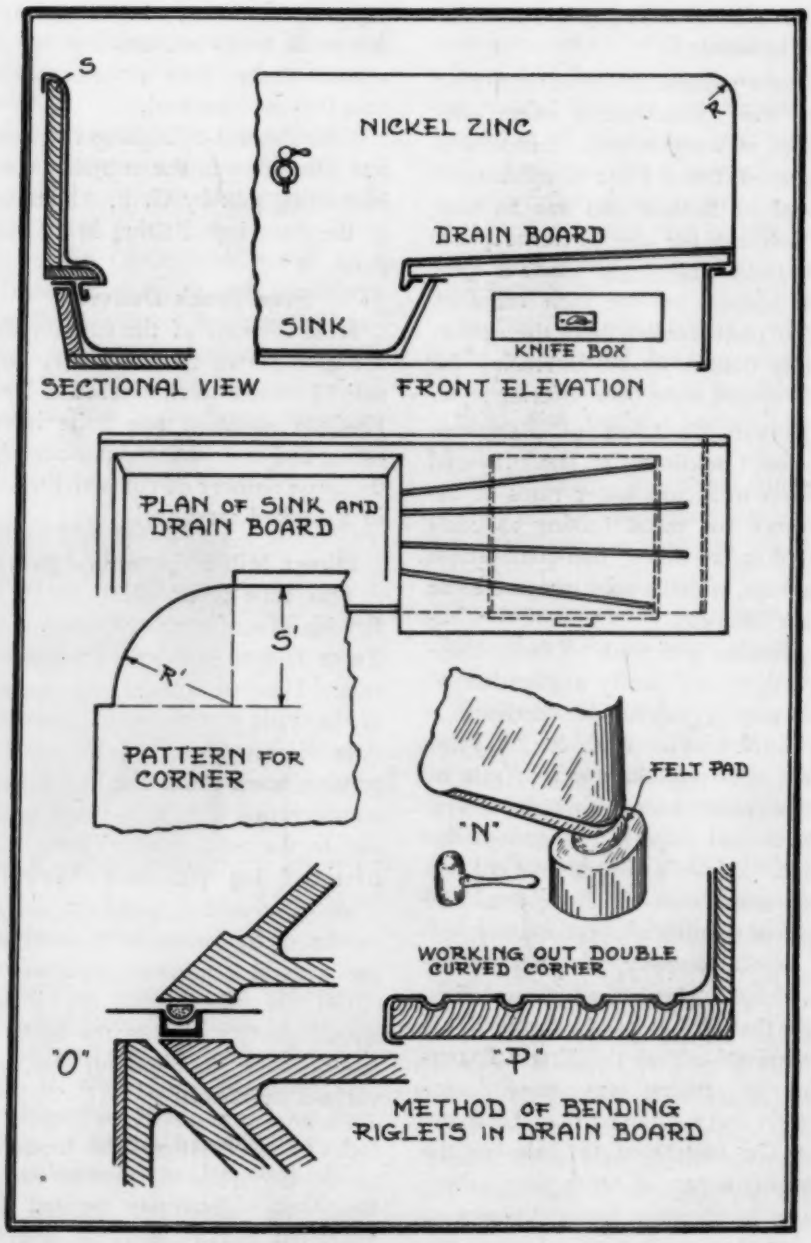
By O. W. Kothe,
Principal St. Louis Technical Institute

KITCHEN sinks are difficult to keep clean; that is, the grease-laden water splashes and runs all over. In time filth gathers in corners, cracks, behind boards, etc., and that is the beginning of cockroaches, water bugs, etc. The idea is to make a construction that is leak proof.

In this the one-piece cast iron enamel sink or a well-made marble sink is the most satisfactory. But these are rather expensive, and to make them more inexpensive there is the element of dirt and leakage to be taken care of. Possibly nickel zinc offers a means of correcting this fault with frame built sink. Here a surface lining can be produced that is leak proof, is clean and always presents a good appearance, as well as being comparatively inexpensive.

So in our drawing we show a frame built sink as used in kitchen and laundries of most popular priced homes. The sink itself can be made of planks and lined with nickel zinc; or be of the cast iron enamel type. Such sinks are set in putty all around, so no leakage may occur. The outside surface of all boards is carefully covered with nickel zinc, as our details show in this drawing.

The main item is to provide suitable drips so the water will not follow itself back. The drain board is also important, as this must be joined to the back board metal by a good seam, preferably a rounded curve. Sharp corners are always hard to keep clean, and require more rubbing to clean thoroughly the dirt out of the corners. The back of the sink has usually rounded



Pattern for Sink Cover

corners at the top. These are laid out as at "M" where R′ is the radius of the face, and S′ is the amount of roll taken from sectional elevation.

Most workmen may find it rather difficult to rounden the corners and not soil the nickel finish. Zinc is a very soft metal and can be worked in most popular shapes, either by bumping or spinning. But in this case the bumping would mar the outside surface, and spinning in a machine is out of the question. So it is better to provide a block, as at "N"; and dress a mallet to a suitable shape, and so rub the curve into shape. A felt pad can be put under the polished surface so the rubbing will not scratch the finish against the block. But by rubbing and holding the metal in certain helpful positions the double curve can be nicely worked in.

In bending the riglets for the drain board, the simple device at "O" may be used. A small half round of possibly ¼ or ⅜-inch diameter is laid over the place where the riglet is to be placed. Then a small channel bar is placed underneath, and the brake jaws are brought down, thus forming a sunken place as a drain in the board. Four or five of these are placed in each board, the wood being grooved

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out to accommodate the riglet as drawing "P" shows.

By this means all sorts of drain boards can be made, either for laundries, soda or soft drink bars, restaurants, etc. Workmen who have the metal available should use a small piece and practice the several exercises we here present.

1920 Postal Schedule Restored by Senate Carries Reduction of $38,550,000

Postal rates of 1920 were restored by the Senate on Wednesday of last week, without a record vote, and the bill, providing for a reduction of $38,550,000 will now go to conference. The 1921 rates voted by the House provide for a reduction of only $13,585,000.

Second class rates reduced $3,860,000 by the House under the 1921 bill were cut $3,750,000 more by the 1920 schedule adopted by the Senate.

The existing rates, 1921 rates adopted by the House and 1920 rates adopted by the Senate on advertising matter, second class, for the various zones, are shown in the following table:

Zones	Existing Rates	House Rates 1921	Senate Rates 1920
1-2	2	1¾	1½
3	3	2½	2
4	6	4	3
5	6	4¾	3½
6	6	5½	4
7	9	7	5
8	9	7¾	5½

Few amendments were made to the bill as reported by the Senate by its Postoffice committee. Senator McMaster of South Dakota obtained passage of a bill authorizing the Postmaster General to appoint a director of parcel post to promote use of that facility.

Third class rates were reduced $8,775,000 by the Senate; they were not affected by the House bill. Fourth class matter was reduced $2,200,000 by the House; by the Senate, $14,640,000.

While opinion differs as to the prospect of the Senate and House conferees reaching an agreement upon postal legislation indications are that Representative Griest, Pennsylvania, chairman of the House Postoffices and Postroads committee, who sponsored the House bill would refuse to recede in conference from the 1921 rates carried in his measure with administration approval.

Other members of the House committee who will participate in the conference also informed the press that they would not accept the Senate bill.

Metal Over Tar Paper Must Be Protected with Asbestos Paper

Will a 40-pound coating tin roof give full life service if it is put on over a tar paper roof, or must the paper be taken off first?

Will the paper absorb enough moisture to keep the tin from sweating? Graf's Tin Shop.
Cullman, Ala.

* * *

"The danger in the use of tin (terne plate) or any other sheet metal over a tar paper roof (as distinguished from an asphalt paper roof) lies in the fact that tar changes its chemical composition as time goes on under the action of such things as the oxygen of the air and the heat of the sun. In doing so, at certain times acid compounds appear which attack the sheet metal.

"We would say it would be perfectly all right to lay the tin over the tar paper provided there is first placed over the tar paper a 16-pound uncoated asbestos paper, similar to that used on warm air furnaces. This should be laid over the entire surface, so that no contact of the tin with the tar paper is possible at any point. The tin should, of course, be painted on its under side before being laid and should be, of course, painted promptly on its upper side as it is laid.

"With this precaution we judge that you will be able to get very satisfactory life indeed out of a good 40-pound coated tin."

GEO. L. BENNETT,
Sheet Metal Trade
Extension Committee.

Merchant & Evans, Chicago, Moves to New Location

The Merchant & Evans Company, Chicago, Illinois, have moved their office and warehouse to 444 West Grand Avenue, Chicago. Their new phones are Whitehall 5551-5552.

Compensation Laws for Workmen Becoming More Liberal

Workmen's compensation laws are becoming more liberal to injured workers, according to a study just completed by the Insurance Department of the U. S. Chamber of Commerce.

Eight more states have joined the ranks of those which provide that injured employes shall receive 60 per cent or more of their weekly wage rate. In 1920 only 12 states paid as much as $12 per week.

In 1928 no state has a maximum compensation rate of less than $12 per week for temporary total disability. Twenty states have laws that provide payments up to $18 per week. The cost of accidents is on the increase and this is Safety Month.

Nelson Snap Hose Couplers
From Nu Idea Stand Company, Inglewood, California.

Please advise us who manufactures Nelson Snap Hose Couplers.

Ans.—L. R. Nelson Manufacturing Company, Peoria, Illinois.

Robertson Ventilator
From Stevens Point Sheet Metal Works, 106 North Second Street, Stevens Point, Wisconsin.

Kindly give us address of company that manufactures the Robertson ventilator.

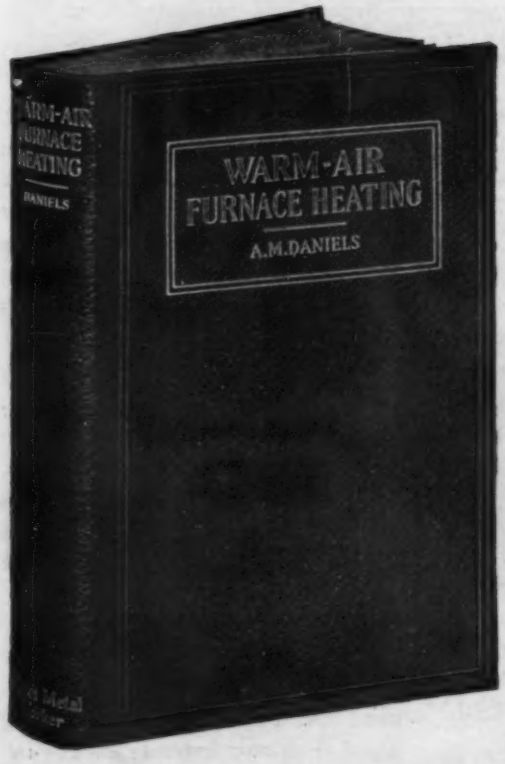
Ans.—H. H. Robertson Company, Pittsburgh, Pennsylvania.

Ruby Soldering Fluid
From Floydada Sheet Metal Works, P. O. Box 581, Floydada, Texas.

Who manufactures what is known as "Ruby soldering fluid"?

Ans.—Ruby Chemical Company, Columbus, Ohio.

A New Book on Warm Air Heating



Just off the Press—Now ready for you

IT IS the book that thousands have been asking for—a book on Warm Air Furnace Heating that is UP-TO-DATE—a book that covers every phase of the subject giving exact data based on research work

Written by A. M. Daniels.

Here is the book that will enable both the experienced furnace man and the student to obtain a working knowledge of up-to-date scientific warm air furnace heating.

Read over the Chapter Headings—notice the complete treatment of the subject.

Many tables are included and some big labor savers ni calculating pipe sizes—also many diagrams.

Chapter Headings

1. Historical.
2. Typical Gravity Pipe Warm-Air Heating Systems.
3. Types of Warm-Air Furnaces.
4. Details of Furnace Construction.
5. Heat Losses.
6. Effect of Register-Air Temperature, Leader Area and Size of Wall Stack Upon Heating Effect Produced.
7. Insulating Coverings and Their Effect Upon Leader and Wall Stack Operation.
8. Casing Diameter vs. Furnace Capacity.
9. Air Supply to Furnace.
10. Furnace Capacity and Rating.
11. Register Grilles vs. Plant Capacity.
12. Chimneys and Flues.
13. Humidity.
14. Evaporating Pans.
15. Combination Heating Systems—Warm Air and Hot Water.
16. Gas Warm-Air Heating.
17. Oil-Burning Warm-Air Heating.
18. One-Pipe Furnace Heating Including Modifications.
19. Hot-Water Supply.
20. Leader Pipe Sizes.
21. Forced-Air Furnace Heating.
22. Coal as Fuel.
23. Pipe and Fittings.
24. Warm-Air Registers and Cold-Air Faces.

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Bookings in Finished Steel Show Slight Improvement—General Demand Relaxes Somewhat

Pig Iron Consumption Continues at Good Rate—Buying of Nonferrous Metals Is Light

APRIL'S steel ingot production record is water over the dam and no deterrent to the present mild downtrend in both demand and production, but it directs attention anew to the extraordinary vitality of steel consumption. It emphasizes, as noted last week, the height from which the seasonal second quarter letdown starts.

Through May, and probably into June, the finished products into which April ingots are being converted will be in the various processes of consumption. Hence a first half year of record proportions, if spotty in some directions, is assured.

Bookings in many finished steel lines have improved slightly in the past week, and May to date has developed more business than the comparable period of April, but the showing is not particularly encouraging because the first half of April was blighted by start of a new quarter.

In general, demand is relaxing moderately—a condition not yet reflected fully in consumption—and operating schedules of most steelmakers, while still approximating 80 per cent, are a shade closer to incoming orders. In the automotive industry, which continues the mainstay of the market, increased Ford operations and parts orders maintain the balance. Steel prices are largely unchanged.

Pig Iron

At Pittsburgh sales of pig iron are confined to small lots. Interest has not developed for the third quarter. Shipments are keeping up fairly well in some directions, and dropping off in others.

Single carloads of malleable bring $17.25, valley. No. 2 foundry is selling in lots up to 200 tons at $17.25, but producers will not commit themselves on what would be done on larger tonnages. Basic is quoted nominally at $16.50, and bessemer at $17.50, valley, supported only by single carload sales.

At Chicago several large purchases for third quarter boosted pig iron sales above 15,000 tons for the week. Spot buying continues active, largely from smaller foundries which have not been contracting.

Two cargoes of boat iron have arrived from Cleveland, and a mixed cargo of iron and steel from Buffalo sellers of boat iron, meeting considerable sales resistance. Some of the boat tonnage sold as low as $17.50. One of two Federal furnaces at South Chicago will go down this week.

The base price of $18.50 is holding for spot and third quarter, as boat iron tonnage is light and has little effect on the market. Sales of southern foundry iron are reported at $15.50. Shipments are about equal to the April rate.

Steady shipments of pig iron on contracts is the feature of the market at Birmingham. Small orders are being booked for delivery in this quarter, but little business has been booked for third quarter. The current price is $16, base, Birmingham. The melt is improving.

Copper

Some copper business was done on the basis of 14.25 cents, Connecticut, the past week but in the past few days the market has been quiet, although firm. Business was divided between May and June. Moderate export sales continued at 14.50 cents, c.i.f. European ports, so the two markets are on par. Shipments continue large and there is an air of confidence about the market.

Lead

New buying of lead has been limited and of routine nature lately. Prices have held steady.

Tin

Tin has continued in an uncertain market with price changes narrow and buying light. Lack of consumer interest is one of the troubles of the market. Supplies are plentiful and users are holding off as long as possible.

Consumption is of good size here and in Europe, but there is less certainty that it will continue so than that production will continue large. The range between spot and futures has narrowed. The Far East has been a free seller at the lower price of the past week.

Zinc

Prime western zinc has shown the most strength in some time. Sentiment has helped the market along more than any increase in buying. On the other hand smelters have been well enough booked so that they have not had to push the market and this fact has been important.

After talk for some time about 6.00-cent zinc, the market has hit that level. The buying has been largely for prompt. High grade metal is unchanged and active.

Solder

Chicago warehouse prices on solder are as follows: Warranted 50-50, $32.25; Commercial 45-55, $29.25; plumbers', $26.25; all per 100 pounds.

Old Metals

Wholesale quotations in the Chicago district, which should be considered as nominal, are as follows: Old steel axles, $16.00 to $16.50; old iron axles, $21.50 to $22.00; steel springs, $16.25 to $16.75; No. 1 wrought iron, $11.50 to $12.00; No. 1 cast, $12.75 to $13.25, all per net tons. Prices for non-ferrous metals are quoted as follows per pound: Light copper, 9 cents; zinc, 3½ cents; cast aluminum, 13¾ cents.

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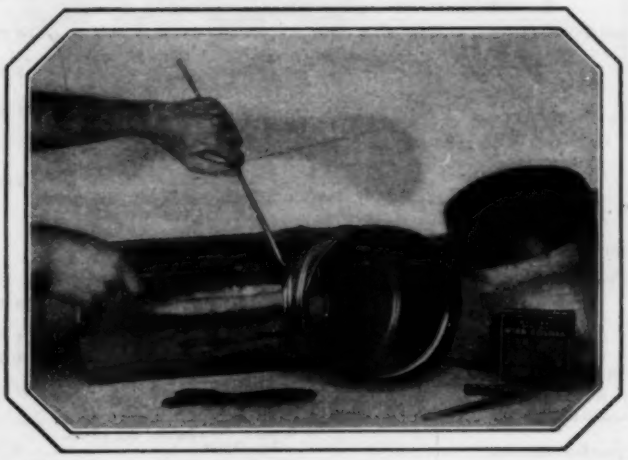

On New Work

ON NEW WORK where time saved on the job means a better profit, the wise tinner uses Kester Solder. Soldering time is a big item in the sheet-metal world and a saving of one-third on this item should be welcomed by everyone.

Common solder needs three operations (solder—flux—heat). Kester only two, because it *"requires only heat."* Kester supplies its own scientific flux from tiny pockets inside itself as it is used.

That's why you save one-third of your soldering time with Kester. Increase your net profit by using Kester Solder from now on.

Kester Acid-Core Solder for general use in 1 lb. cartons; 1, 5 and 10 lb. spools. Small package Acid-Core Solder, Kester Metal Mender for autoist, householder, etc. For delicate radio and electrical work — Kester Rosin-Core Solder.

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Made of one piece of heavy gauge material, in all styles and angles from 10 to 90 degrees, of 24, 26, 28 ga. ternes, then galvanized after formation.

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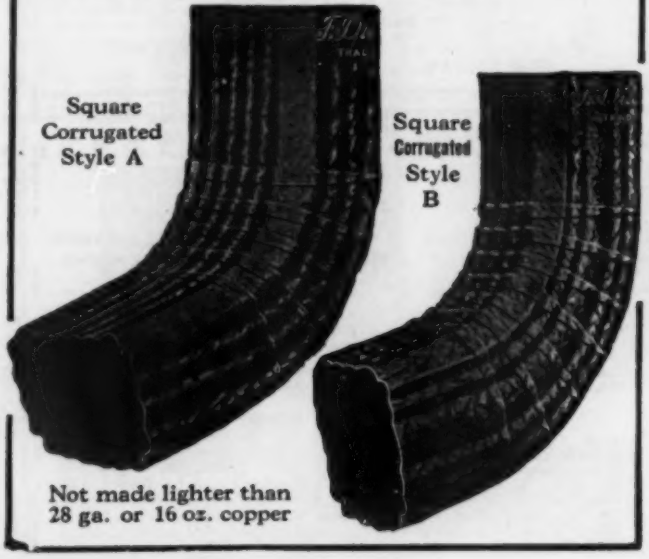

Not made lighter than 28 ga. or 16 oz. copper

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Chicago Warehouse Metal and Furnace Supply Prices

AMERICAN ARTISAN is the only publication containing Western Metal, Furnace Supply and Hardware prices corrected weekly

METALS

PIG IRON

Chicago Fdy., No. 2	$18 50
Southern Fdy. No. 2	22 01
Lake Superior Charcoal	27 04
Malleable	18 50

FIRST QUALITY BRIGHT TIN PLATES

1C	20x28 112 sheets	$25 10
IX	20x28	29 60
IXX	20x28 56 sheets	16 20
IXXX	20x28	17 55
IXXXX	20x28	18 95

TERNE PLATES

		Per Box
IC	20x28, 40-lb. 112 sheets	$25 00
IX	20x28, 40-lb. 112 sheets	27 75
IC	20x28, 25-lb. 112 sheets	21 15
IX	20x28, 25-lb. 112 sheets	23 80
IC	20x28, 20-lb. 112 sheets	19 55
IV	20x28, 20-lb. 112 sheets	22 05
IC	20x28, 15-lb. 112 sheets	15 05

"ARMCO" INGOT IRON PLATES

No. 8 ga. up to and including ¼ in.—100 lbs. $4 55

COKE PLATES

Cokes, 80 lbs., base, 20x28	$13 60
Cokes, 90 lbs., base, 20x28	13 80
Cokes, 100 lbs., base, 20x28	14 00
Cokes, 107 lbs., base, IC 20x28	14 80
Cokes, 135 lbs., base, IX 20x28	16 40
Cokes, 155 lbs., base, 56 sheets	9 20
Cokes, 175 lbs., base, 56 sheets	10 05
Cokes, 195 lbs., base, 56 sheets	10 90

BLUE ANNEALED SHEETS

Base 10 ga.	per 100 lbs. $3 50
"Armco" 10 ga.	per 100 lbs. 4 00

ONE PASS COLD ROLLED BLACK

No. 18-20	per 100 lbs.	$3 75
No. 22	per 100 lbs.	3 90
No. 24	per 100 lbs.	3 95
No. 26	per 100 lbs.	4 05
No. 27	per 100 lbs.	4 10
No. 28	per 100 lbs.	4 20
No. 29	per 100 lbs.	4 35
No. 30	per 100 lbs.	4 45

"ARMCO" GALVANIZED

"Armco" 24	per 100 lbs.	$6 15

GALVANIZED

No. 16	per 100 lbs.	$4 30
No. 18	per 100 lbs.	4 45
No. 20	per 100 lbs.	4 60
No. 22	per 100 lbs.	4 65
No. 24	per 100 lbs.	4 80
No. 26	per 100 lbs.	5 05
No. 27	per 100 lbs.	5 15
No. 28	per 100 lbs.	5 30
No. 30	per 100 lbs.	5 70

BAR SOLDER

Warranted 50-50	per 100 lbs.	$32 25
Commercial 45-55	per 100 lbs.	29 25
Plumbers	per 100 lbs.	26 25

ZINC

In Slabs	$ 8 50

SHEET ZINC

Cash Lots (600 lbs.)	$12 00
Sheet Lots	13 00

BRASS

Sheets, Chicago base	17¾c
Mill base	18c
Tubing, brazed base	26¾c
Wire, base	18¼c
Rods, base	15½c

COPPER

Sheets, Chicago base	24c
Mill base	23c
Tubing, seamless base	25¾c
Wire, No. 9, B & S Ga.	18¾c
Wire, No. 10, B & S Ga.	19c
Wire, No. 11, B & S Ga.	19¾c
Wire, No. 3, B & S Ga. and heavier	18¼c

LEAD

American Pig	$7 00
Bar	8 00

TIN

Pig Tin	per 100 lbs.	$59 00
Bar Tin	per 100 lbs.	60 00

HARDWARE, SHEET METAL SUPPLIES, WARM AIR FURNACE FITTINGS AND ACCESSORIES.

ASBESTOS

Paper up to 1/16	6c per lb.
Roll board	6¼c per lb.
Mill board 3/32 to ⅛	6c per lb.
Corrugated Paper (250 sq. ft. to roll)	$6 00 per roll

BRUSHES

Furnace Pipe Cleaning Bristle, with handle, each	$0 75
Flue Cleaning Steel only, each	1 25

BURRS

Copper Burrs only 40-2½%

CEMENT, FURNACE

American Seal, .5-lb. cans, net	$ 45
American Seal, 10-lb. cans, net	85
American Seal, 25-lb. cans, net	2 25
Pecora	per 100 lbs. 7 50

CHIMNEY TOPS

Adams' Revolving	Wt. Doz.	Price Doz.
4 in.	21 lbs.	$11 00
6 in.	24 lbs.	11 50
7 in.	30 lbs.	13 50
8 in.	38 lbs.	15 00
9 in.	61 lbs.	16 50
10 in.	56 lbs.	18 00
12 in.	66 lbs.	22 00
14 in.	110 lbs.	36 00

CLINKER TONGS

Each	$0 75
Per doz.	8 40

CLIPS

Damper No-Rivet Steel, with tail pieces, per gross	$9 50
Rivet Steel, with tail pieces, per gross	7 50
Tail pieces, per gross	2 40

COPPERS—Soldering

Pointed Roofing

3 lb. and heavier	per lb.	40c
2½ lb.	per lb.	45c
2 lb.	per lb.	48c
1½ lb.	per lb.	55c
1 lb.	per lb.	60c

CORNICE BRAKES

Chicago Steel Bending Nos. 1 to 6B ..... Net

CUT-OFFS

Gal., plain, round or cor. rd.

26 gauge	30%
28 gauge	35%

DAMPERS

"Yankee" Hot Air 7 inch, each 20c, doz.	$1 60
8 inch, each 25c, doz.	2 20
9 inch, each 30c, doz.	2 60
10 inch, each 33c, doz.	2 80
Smoke Pipe 7 inch, doz.	$1 60
8 inch, doz.	2 20
9 inch, doz.	2 00
10 inch, doz.	2 75
12 inch, doz.	4 50

ADAMS No. 1 CHECK

Check and Collar Complete 8 inch, each	2 00
9 inch, each	2 25
End Check Only 8 inch, each	1 60
9 inch, each	1 85
Collar Only 8 inch, each	50
9 inch, each	65

No. 2 CHECK

8 inch, each	1 00
9 inch, each	1 00

10% Disc. on Adams No. 1 and No. 2 Check

Diamond Smoke Pipe 7 inch, doz.	$	2 00
8 inch, doz.		3 20
9 inch, doz.		4 80
10 inch, doz.		6 00

Adams' Sheet Metal

7 inch, doz.	$ 1 60
8 inch, doz.	2 20
9 inch, doz.	2 60
10 inch, doz.	3 80
12 inch, doz.	3 50
14 inch, doz.	5 00

EAVES TROUGH

Galv. Crimpedge, crated 75 & 5%	
Zinc, "Barnes"	60%

ELBOWS

Conductor Pipe

Galv. plain or corrugated, round flat Crimp.

28 Gauge	60%
26 Gauge	45%
24 Gauge	15%

Galv. & Terne Steel

Plain Rd. and Rd. Corr.:

28 Ga.	60%
26 Ga.	45%
24 Ga.	15%

Square Corrugated

No. 28 Gauge	50%
26 Gauge	35%

Portico Elbows

Standard Gauge Conductor Pipe, plain or corrugated.

Not nested	70 & 5%
Nested Solid	70 & 5%

Sq. Corr., A. & B. & Octagon

28 Ga.	50%
26 Ga.	35%

Portico

1", 1¼", 1½" 45%

Copper

16 oz., all designs 50%

Zinc—

All styles 60%

ELBOWS—Stove Pipe

1-piece Corrugated. Uniform Blue "Milcor" No. 28 Gauge.

	Doz.
5-inch	$1 05
6-inch	1 20
7-inch	1 75

Special Corrugated

6-inch	$1 00
7-inch	1 60

Adjustable—Uniform Blue

"Milcor" No. 28 Gauge. Uniform Blue.

5-inch	$1 65
6-inch	1 75
7-inch	2 10

WOOD FACES—50% off list.

FENCE

726-6-12½% (100 rods)	$28 68
1948-6-14½% (100 rods)	43 62

FILES AND RASPS

Heller's (American)	50-10%
American	60-10%
Arcade	50%
Black Diamond	50%
Eagle	50%
Great Western	50%
Kearney & Foot	50%
McClellan	50%
Nicholson	50%
Simonds	60%

FIRE POTS

Geo. W. Diener Mfg. Co.	Ea.
No. 02 Gasoline Torch, 1 qt.	$ 5 13
No. 0250, Kerosene, or Gasoline Torch, 1 qt.	6 50
No. 10 Tinner's Furn. Square tank, 1 gal.	11 20
No. 15 Tinner's Furn. Round tank, 1 gal.	10 70
No. 21 Gas Soldering Furnace	2 60
No. 110 Automatic Gas Soldering Furnace	10 50

Quick Meal Stove Co.

Vesuvius, F. O. B. St. Louis 30%

(Extra Disct. for large quantities.)

GALVANIZED WARE

Pails (Galv. after made), 10-qt.	$3 00
Tubs (Galv. after made). No. 1	5 75
No. 2	6 50

GLASS

Single Strength, A, 52-in. brackets	87%
Single Strength, A, 34 to 40-in. bracket	86%
Single Strength, A, all other brackets	89-5%
Double Strength, A, all sizes	89%

HANGERS

Conductor Pipe

Milcor Perfection Wire	25%
Milcor Triplex Wire	10%

Eaves Trough

Milcor Steel (galv. after forming) List	plus 12½%
Milcor Selflock E. T. Wire, List	plus 50%

HOOKS

Conductor

"Direct Drive" Wrought Iron for wood or brick 15%

HUMIDIFIER

"Front-Rank," Automatic

In single lots	50%
In lots of 10 or more	50-5%
In lots of 25 or more	50-10%
Vapor pans, etc., each	50%

LIFTERS

Stove Cover

Coppered	per gro.	$6 00
Alaska	per gro.	4 75

MALLETS

Tinners Hickory	per doz.	$2 25

MITRES

Galvanized steel mitres,

28 Ga.	70
26 Ga.	80-20

NAILS

Cut Steel	$4 25
Cut Iron	4 25

Wire

Common	$ 2 10
Cement Coated	2 10

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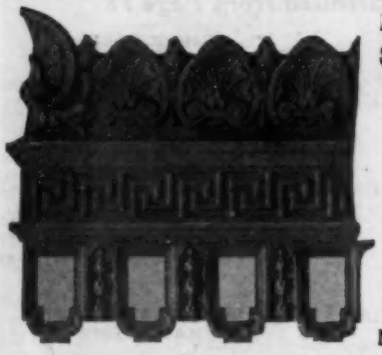

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BLOW TORCHES

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Per Gasoline

Vesuvius Blow Torches are made of brass or non-corrosive oxydized terne plate. The latter is particularly recommended for hard usage.

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825 Chouteau Ave. St. Louis, Mo.

IF there is a tool or machine that you need and you don't know where to get it—

Write to the

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to attend the

OSBORN SHEET METAL SHOW

May 22, 23, 24 and 25th

DO this while you are in Cleveland taking part in the National Association of Sheet Metal Contractors and the Ohio Sheet Metal Contractors Association Convention.

We will hold open house the entire week and want you to visit our plant, as well as an UNUSUALLY COMPLETE EXHIBIT of SHEET METAL WORKERS' EQUIPMENT and SUPPLIES of all kinds.

Power Shears, Presses, Drills, Saws, Welders, etc., —also hand tools and machines, will be demonstrated by factory representatives, and you should get some new ideas.

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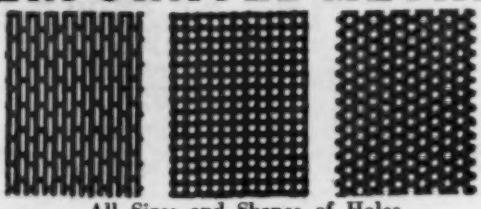

All Sizes and Shapes of Holes
In Steel, Zinc, Brass, Copper, Tinplate, etc.
For All Screening, Ventilating and Draining
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NETTING, POULTRY

Galvanized before weaving 60%
Galvanized after weaving. 50-10%

PASTE

Asbestos Dry Paste:

200-lb. Barrel $16 00
100-lb. barrel 8 75
25-lb. pail 3 50
10-lb. bag 1 10
5-lb. bag 60
2½-lb. cartons 35

POKERS, FURNACE

Each $0 75

POKERS, STOVE

Nickel Plated, coil handles, per doz. 1 10
W'r't Steel, str't or bent, per doz. $0 75

PIPE

Conductor

Cor. Rd., Plain Rd., or Sq.

Galvanized

Crated and nested (all gauges) 75-2½%
Crated and not nested (all gauges) 70-15%

Furnace Pipe

Double Wall Pipe and Fittings 50%
Single Wall Pipe, Round Galvanized Pipe 50%
Galvanized and Tin Fittings 50%

Lead

Per 100 lbs. $12 50

Stove Pipe

"Milcor" "Titelock" Uniform Blue Stove

28 gauge, 5 inch U. C. nested 10 50
28 gauge, 6 inch U. C. nested 11 00
28 gauge, 7 inch U. C. nested 13 00
30 gauge, 5 inch U. C. nested 9 00
30 gauge, 6 inch U. C. nested 10 00
30 gauge, 7 inch U. C. nested 12 00

T-Joint Made up

6-inch, 28 ga. ...per doz. $ 4 00

All Zinc

No. 11, all styles 60%

PULLEYS

Furnace Tackle ....per doz. $0 85
.....per gro. 8 50
Furnace Screw (enameled) .....per doz. 75

PUTTY

Commercial Putty, 100-lb. Kits $3 50

QUADRANTS

Malleable Iron Damper 10%

REDUCERS—Oval Stove Pipe

	Per Doz.
7—6, 28-gauge, 1 doz. in carton	$2 00

REGISTERS AND BORDERS

Baseboard, Floor and Wall.

Cast Iron 20%
Steel and Semi-Steel 40%
Baseboard, 1 piece 40-20%
Baseboard, 2 piece 40%
Wall 40%
Adjustable Ceiling Ventilators 40%

Register Faces—Cast and Steel

Japanned, Bronzed and Plated, 4x6 to 14x14 ..... 40%
Large Register Faces—Cast, 14x14 to 28x42 ..... 60%
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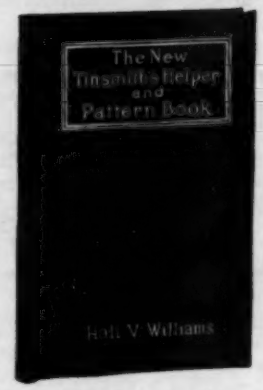

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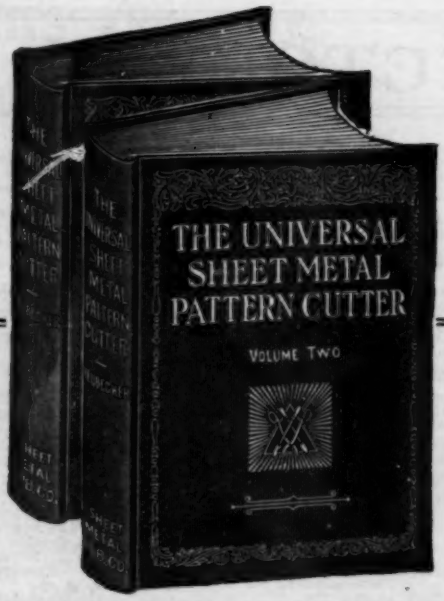

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Harrington & King Perforating Co., Chicago, Ill.

Shears—Hand and Power.
Marshalltown Mfg. Co., Marshalltown, Iowa
Peck, Stow & Wilcox Co., Southington, Conn.
Ryerson & Son, Inc., Jos. T., Chicago, Ill.
Tinners' Machinery Co., Chicago, Ill.
Unishear Co., Inc., New York, N. Y.
Viking Shear Co., Erie, Pa.

Sheet Metal Screws—Hardened, Self-Tapping.
Parker-Kalon Corp., 200 Varick St., New York

Sheets—Black and Galvanized.
Armco Distributors Ass'n of America, Middletown, Ohio
Burton Co., The W. J., Detroit, Mich.
Inland Steel Co., Chicago, Ill.
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Ryerson & Son, Inc., Jos. T., Chicago, Ill.
Taylor Co., N. & G., Philadelphia, Pa.
Wheeling Corrugating Co., Wheeling, W. Va.

Sheets—Iron.
Armco Distributors Ass'n of America, Middletown, Ohio
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
Ryerson & Son, Inc., Jos. T., Chicago, Ill.

Sheets—Tin.
Merchant & Evans Co., Philadelphia, Pa.
Taylor Co., N. & G., Philadelphia, Pa.

Sheets—Zinc.
New Jersey Zinc Sales Co., The, New York, N. Y.

Shingles and Tiles—Metal.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
Wheeling Corrugating Co., Wheeling, W. Va.

Shingles—Zinc.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City

Sifters—Ash.
Diener Mfg. Co., G. W., Chicago, Ill.

Sky Lights.
Lupton's Sons Co., David, Philadelphia, Pa.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City

Snips.
Peck, Stow & Wilcox Co., Southington, Conn.
Ryerson & Son, Inc., Jos. T., Chicago, Ill.

Solder.
Chicago Solder Co., Chicago, Ill.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City

Soldering Furnaces.
Burgess Soldering Furnace Co., Columbus, Ohio
Diener Mfg. Co., G. W., Chicago, Ill.
Quick Meal Stove Co., St. Louis, Mo.
Ryerson & Son, Inc., Jos. T., Chicago, Ill.

Specialties—Hardware.
Diener Mfg. Co., G. W., Chicago, Ill.
Hessler Co., H. E., Syracuse, N. Y.

Stars—Hard Iron Cleaning.
Fanner Mfg. Co., Cleveland, Ohio

Statuary.
Friedley-Voshardt Co., Chicago, Ill.
Gerock Bros. Mfg. Co., St. Louis, Mo.

Steel Pipe—Welded.
Chicago Metal Mfg. Co., Chicago, Ill.

Stove Pipe Reducers.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City

Stoves—Camp.
Quick Meal Stove Co., St. Louis, Mo.

Stoves—Gasoline and Oil.
Quick Meal Stove Co., St. Louis, Mo.

Stoves and Ranges.
Quick Meal Stove Co., St. Louis, Mo.
Thatcher Co., Newark, N. J.

Tacks, Staples, Spikes.
American Steel & Wire Co., Chicago, Ill.

Tinplate.
Burton Co., The W. J., Detroit, Mich.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Taylor Co., N. & G., Philadelphia, Pa.

Tools—Tinsmith's.
Bertsch & Co., Cambridge City, Ind.
Burton Co., The W. J., Detroit, Mich.
Driss & Krump Mfg. Co., Chicago, Ill.
Hyre Mfg. Co., New York, N. Y.
Marshalltown Mfg. Co., Marshalltown, Iowa
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Peck, Stow & Wilcox Co., Southington, Conn.
Ryerson & Son, Inc., Jos. T., Chicago, Ill.
Tinners' Machinery Co., Chicago, Ill.
Viking Shear Co., Erie, Pa.
Whitney Mfg. Co., W. A., Rockford, Ill.
Whitney Metal Tool Co., Rockford, Ill.

Torches.
Burgess Soldering Furnace Co., Columbus, Ohio
Diener Mfg. Co., G. W., Chicago, Ill.
Quick Meal Stove Co., St. Louis, Mo.
Ryerson & Son, Inc., Jos. T., Chicago, Ill.

Trade Extension.
Copper & Brass Research Association, New York, N. Y.
Sheet Steel Trade Extension Committee, Pittsburgh, Pa.

Trimmings—Stove.
Fanner Mfg. Co., Cleveland, Ohio

Ventilators.
Aeolus Dickinson Co., Chicago, Ill.
Akrat Ventilators, Inc., Chicago, Ill.
Arex Company, Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Friedley-Voshardt Co., Chicago, Ill.
Kernchen Co., Chicago, Ill.
Lupton's Sons Co., David, Philadelphia, Pa.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
Standard Ventilator Co., Lewisburg, Pa.

Ventilators—Ceiling.
Hart & Cooley Co., New Britain, Conn.
Henry Furnace & Fdy. Co., Cleveland, Ohio
Tuttle & Bailey Mfg. Co., New York

Windows—Steel.
Lupton's Sons Co., David, Philadelphia, Pa.

Wire—Electrical.
American Steel & Wire Co., Chicago, Ill.

Wire Hoops.
American Steel & Wire Co., Chicago, Ill.

Wire Rope.
American Steel & Wire Co., Chicago, Ill.

Zinc.
Merchant & Evans Co., Philadelphia, Pa.
New Jersey Zinc Co., The, New York, N. Y.

WANTS AND SALES

Yearly subscribers to the AMERICAN ARTISAN may insert advertisements of not more than fifty words in our Want and Sales Columns WITHOUT CHARGE.

Such advertisements, however, must be limited to help or situation wanted, tools or equipment for sale, to exchange or to buy, business for sale or location desired and must reach our office by Thursday of the week of publication. This privilege is not extended to manufacturers or jobbers—or those making a business of buying and selling used machines, employment agencies and brokers.

When sending advertisement state whether your name or blind number is to be used.

NOTICE

To those answering Special Notice and Want Advertisements

ONLY FIRST CLASS MAIL CAN BE FORWARDED

BUSINESS CHANCES

Lightning Rods—Dealers who are selling Lightning Protection will make money by writing to us for our latest Factory to Dealer Prices. We employ no salesmen and save you all overhead charges. Our Pure Copper Cable and Fixtures are endorsed by the National Board of Fire Underwriters and hundreds of dealers. Write today for samples and prices. L. K. Diddie Company, Marshfield, Wis.

Partner wanted on a profit sharing basis only. Very little investment required (for good faith). A well established furnace and furnace specialty business in a city of near 100,000 wants a practical furnace man familiar with Standard Code installation and with selling ability. Must be ambitious and not afraid of work. One 30 to 50 years of age preferred. Address L472, AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Ill.

For rent or will sell plumbing heating and sheet metal business in lively town of 2,000. Cement block building 22-34, two floors with basement. Will rent with tools and machines for $30.00 per month. Must have $500.00 to buy stock. Write for full information to A. C. Buzzard, Holly, Michigan. M472

For Sale—On account of death will sell hardware store located in a good residence district between Piggly Wiggly store and picture show. Rent, $30, with steam heat. Size 20x50. Invoices about $3,000. Cash. Address Womack Hardware Store, 1475 S. Pearl St., Denver, Colo. P-473

For Sale—Sheet metal and roofing business in the best city in Florida. One of the older firms in city. Going to Europe is reason for selling. Must have $2,000 cash. Balance to suit buyer. Address Q-473, AMERICAN ARTISAN, 620 S. Michigan Ave., Chicago, Ill.

BUSINESS CHANCES

For Sale—Tinshop in one of the best towns in the state. Owner wants to sell on account of old age. This is an old established business. Will invoice between $1,000 and $1,500. Located in fireproof building with cheap rent. Will sell material and rent the tools or sell entire business. Good opportunity for someone. Address Strum Tin Shop, Macomb, Ill. S-473

For Sale—Good Sheet Metal Shop in Central Indiana city. Established 16 years. Full line of up-to-date tools and equipment in fine condition. Plenty of good work coming up now and will step out and turn business and good will over to right party for $1,500.00 cash. Other business reason for selling. Address Y-472, AMERICAN ARTISAN, 620 S. Michigan Av., Chicago, Ill

For Sale—Sheet metal and furnace shop in county seat town of 3,500 population in Northeastern Iowa. Good set of tools and good business. Shop 25x40. Address X472, AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois.

Hardware Stock for Sale—Good clean stock of hardware in South Dakota. Have a good trade. Death of owner is reason for selling. Address R-473, AMERICAN ARTISAN, 620 S. Michigan Ave., Chicago, Ill.

For Sale—Established sheet metal business in Des Moines, Ia. Half-owner must retire. Address K472, AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Ill.

SITUATION WANTED

Position Wanted—First-class combination man desires permanent position in Colorado or neighboring states. Can do anything in plumbing, hot water, steam, vapor or warm air heating or sheet metal work. 20 years' experience. Married. Can take charge of shop. Managed one shop 7 years, operated own 5 years. Employed, but can come after May 15. Changing on account of wife's health. Address O-473, AMERICAN ARTISAN, 620 S. Michigan Ave., Chicago, Ill.

Situation Wanted—Hardware or furniture store having furnace department in connection and wishing to place this department in experienced hands to run and operate for them on paying basis. That's the job I want and I can prove my worth if given the opportunity. Can lay out, estimate, sell and install. References. Address T472, AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Ill.

Wanted—A job by a real first-class sheet metal worker. 22 years' experience mostly inside work. Thoroughly understands the business from A to Z, knows how to do an honest day's work and is not afraid to do it. References both as to character and ability if desired. Address S. M. Strange, 409 West Third Street, Charlotte, N. C. P472

Situation wanted as sheet metal worker or lay out man. Have had heating, blow pipe and factory experience. Married and 30 years of age. Sober and steady. Want steady work with reliable firm, prefer Wisconsin or California. Address S472, AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Ill.

Situation Wanted—By reliable furnace salesman who can sell furnaces and knows the estimating and installation part of the business. I believe in the Standard Code and fan system when necessary. Address T471, AMERICAN ARTISAN, 620 South Michigan avenue, Chicago, Illinois.

Position wanted by sheet metal worker, married and thirty years of age. 12 years' experience in sheet metal work. Can draft patterns and read blue prints. State wages in first letter. Address R472, AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Ill.

SITUATION WANTED

Situation Wanted as foreman for a furnace department. Nine years' experience including 2 years' selling. Can supervise men. Strong believer in Standard Code. Want steady work. No boozer. References furnished. Address 3533 Emerson Ave., So. Minneapolis, Minn. E-473

Wanted—Position as tinner. I am a good all around mechanic. A No. 1 on hot air furnaces. Had 20 years' experience. Married, good habits and steady. Can go anywhere at once. Address R471, AMERICAN ARTISAN, 620 S. Michigan avenue, Chicago, Illinois.

Position wanted by a first-class tinner and furnace man. Knows the Standard Code. Can do inside and outside work. 25 years' at the trade. Married. Can do anything that comes in any tin shop. Address W. J. Mack, 201 2nd Avenue, South Saint Charles, Ill. W472

Combination plumber and tinner wants job at once. Can do plumbing, furnace and sheet metal work. 35 years of age, married and 12 years' experience. Address H. W. Chambers, Clarksville, Ia. O472

Position Wanted by all around tinner and layout man. 45 years of age. Prefer shop or inside work. Address D-473 AMERICAN ARTISAN, 620 S. Michigan Ave., Chicago, Ill.

HELP WANTED

Wanted—First-class tinner and plumber. Must be able to handle all kinds of work required in a country town of 1,000 population. Unless you are steady and sober do not apply. State wages and references in first letter. Address H472, AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Ill.

Wanted At Once—Good all around tinner and furnace man. Must be able to read blue prints and lay out job. Also to do ventilating, skylight and blow pipe work. Located in Central Illinois. Address all letters to J472, AMERICAN Artisan, 620 South Michigan Avenue, Chicago, Ill.

Wanted—Combination Sheet Metal Worker and Plumber. Must be A-1 mechanic not over 40 years of age. Steady work for one who can deliver. State wages and give age and references. Address B-473 AMERICAN ARTISAN, 620 S. Michigan Ave., Chicago, Ill.

Wanted — Two first-class all around sheet metal workers. Steady position in South. Write fully, giving experience in different branches of business. Address T-473, AMERICAN ARTISAN, 620 S. Michigan Ave., Chicago, Ill.

Tinner Wanted—Must be a good tinner, sheet metal worker and roofer, also furnace man. Sober. Address C. G. Timm, North Platte, Neb. G472

Wanted—Retail Furnace Salesman to work in large Illinois city. Address A-473, AMERICAN ARTISAN, 620 So. Michigan Ave., Chicago, Ill.

MISCELLANEOUS

For Sale—One portable Sturtevant furnace cleaner. Used only 6 months. Will sacrifice at a bargain. One hundred dollars takes it. Less than one-half its cost. Address Wm. A. Seither, 1424 Johnson St., Keokuk, Iowa. M-473

Wanted—Cast Iron legs for sheet steel enameled bathtubs. Mail illustrations and price to Faust Mfg. Co., Comfort, Texas. C-473

SPECIAL NOTICES

The Rate for Special Notices — displayed want ads — $3.00 per inch per insertion

When sending copy state whether your name or blind number is to be used—also how many insertions are desired.

PATENTS

HUBERT E. PECK
Patent Attorney
Barrister Bldg., WASHINGTON, D. C.

WANTED

Three salesmen to travel in middle and New England States to sell Coal Ranges and Parlor Stoves for an old established house. Men with experience in Retail Stove Trade preferred. Address with experience and reference to E472, American Artisan, 620 S. Michigan Ave., Chicago, Ill.

FURNACE SALESMEN WANTED

We have an opening for one or two high class furnace salesmen for territories in which business is already developed. If you have a business producing record behind you, you are the man we are looking for. If not, don't answer. Address Lennox Furnace Co., Inc., Syracuse, New York. F472

SALESMAN WANTED

to sell ventilating equipment of exceptional merit. We are interested only in a good live representative who can produce results — commission basis. Address F473, AMERICAN ARTISAN, 620 So. Michigan Ave., Chicago, Ill.

WHAT DO YOU NEED?

Our Stock of New and Used Sheet Metal Working Machinery

—— IS COMPLETE ——

CHICAGO STEEL BRAKES
PEXTO SQUARE SHEARS
FOLDERS, ROLLS, BURRING, WIRING, TURNING, FLANGING, BEADING MACHINES
WHITNEY ANGLE IRON SHEARS
BENDERS, PUNCHES, ETC.
PARKER-KALON SHEET METAL SCREWS, WISS SNIPS, AND A COMPLETE LINE OF SHOP SUPPLIES AND HAND TOOLS

TINNERS MACHINERY CO.
100 S. Jefferson St., Chicago, Ill.
"If It's Used in the Sheet Metal Shop We Sell It"

SPECIAL NOTICE

WANTED

Retail Furnace Salesman for Chicago. Salary and Commission. Address Round Oak Heating Co., 711 S. Wells Street, Chicago, Illinois. H473

WANTED

Young man with energy and initiative to work in Sales Department of well known furnace manufacturer. Applicant should have Sales and Advertising ability and some experience. Splendid opportunity for advancement. If you can deliver the goods state salary in first letter. Strictly confidential. Address L473, care of American Artisan, 620 South Michigan Ave., Chicago, Ill.

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A quality product, simple in design and accurate in detail.
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AKRAT VENTILATORS, INC.
1191 Builders Bldg. CHICAGO

AMERICAN ARTISAN ADS BRING RESULTS

SPECIAL NOTICES

WANTED

To hear from owner of hardware store for sale. Cash price, particulars. Address D. F. Bush, Minneapolis, Minn. J473

FOR SALE

One pair Power Rolls 76" long with 6" diameter rolls. This pair of rolls are in excellent condition and good for hard service. Will take up to 5/16" metal. Price $300.00 F. O. B. Louisville, Kentucky. Write Chas. Reibel Co., 118 S. 2nd St., Louisville, Kentucky. K473

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Original Siphonage Ventilator
The Power Fans Only Rival!
200,000 Perfect Installations!
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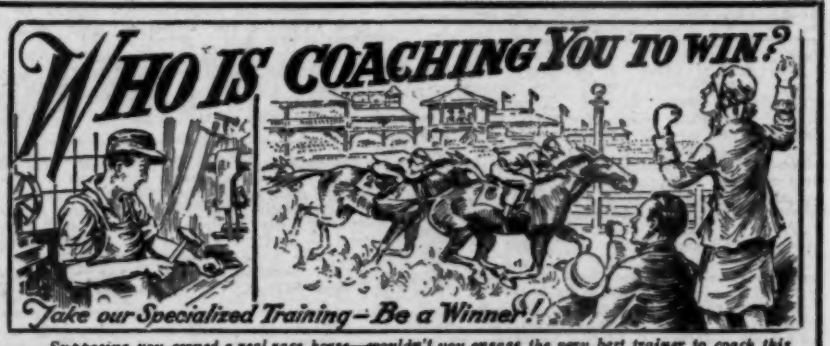

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8. Successful Contractor,
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☐ SHEET METAL CONTRACTING & ESTIMATING
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NATIONAL

ASSOCIATION OF SHEET METAL CONTRACTORS *of the* UNITED STATES

Convention

JOINTLY *with the* OHIO SHEET METAL CONTRACTORS' ASSOCIATION

at

Cleveland, Ohio, May 22, 23, 24 & 25

Hotel Statler

THIS year conventions are "clicking"— they mean more because more work is being accomplished and the delegates are more interested.

Business problems this year demand greater interest and work— every sheet metal contractor and warm air furnace installer is eager for information.

That's why AMERICAN ARTISAN is on the job more than ever with its convention reports

The May 26th Issue of AMERICAN ARTISAN

published *immediately following* the convention will contain the most complete and earliest report of this National Convention, enabling thousands of interested sheet metal contractors who are unable to attend to know what transpired at the meetings. (See program published elsewhere in this issue.)

Manufacturers of Sheet Metal, Sheet Metal Products, Warm Air Furnaces and Accessories should reserve advertising space in the May 26th issue of AMERICAN ARTISAN *Now.*

Attend this Important Convention

NO 922 RIDGE AND HIP TILE
NO. 922 APPLIED AS HIP TILE
NO. 924 GABLE FINIAL
NO. 922-A STARTER for HIP TILE
SHOWING RIDGE TILE APPLIED WITH GABLE FINIAL
NO 14 HIP FINIAL
NO 12 GABLE FINIAL
NO 923 HIP FINIAL

NO roof is complete in appearance or serviceability without metal trimmings . . . . metal ridging, metal hips, metal valleys and finials. And no roof trimming is so universally adaptable, practical and pleasing as the Milcor No. 922 series of Ridge and Hip Tile.

On all types of roofs the Milcor "922 Family" is appropriate.

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